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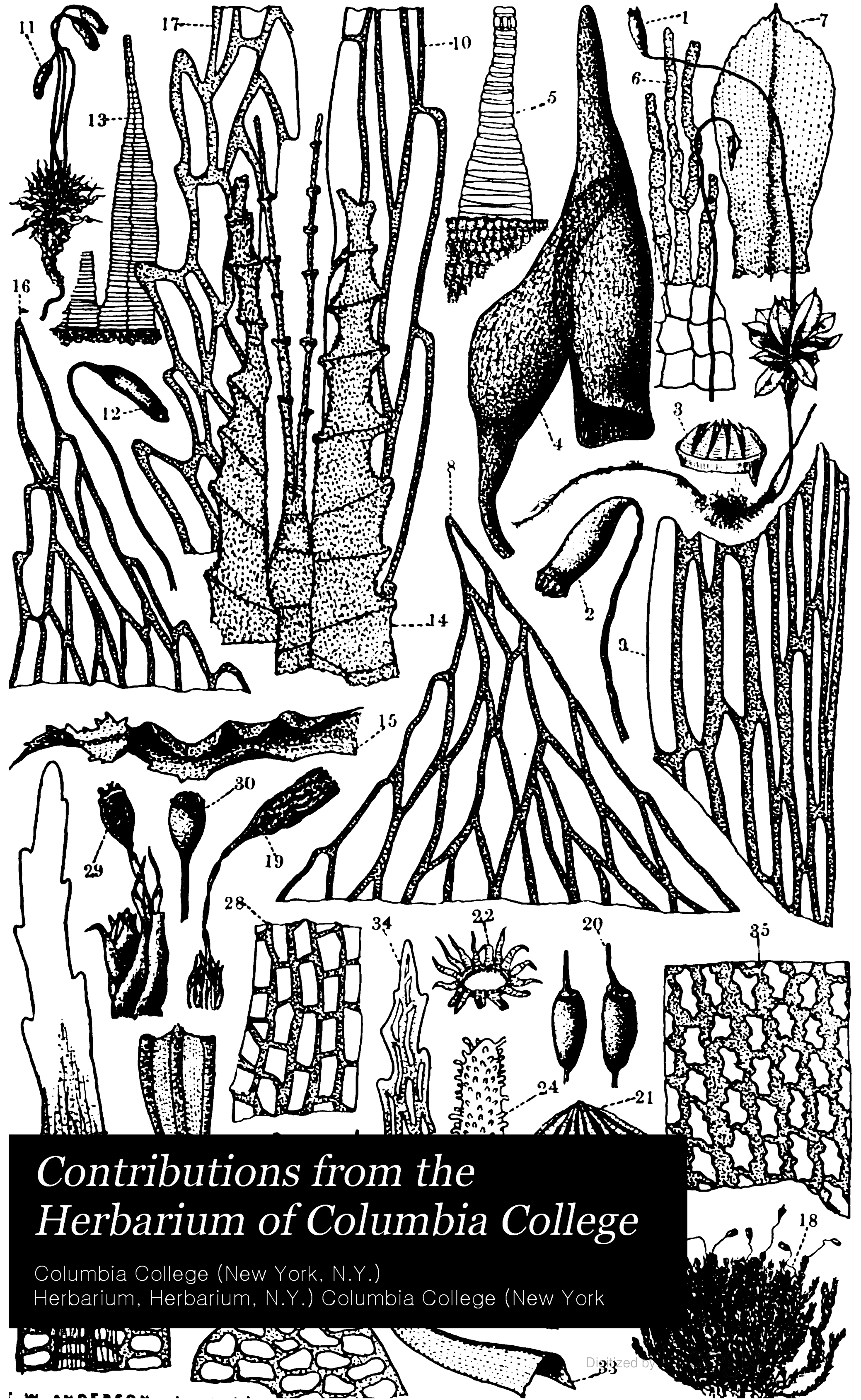

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FROM THE

HERBARIUM OF COLUMBIA COLLEGE.

VOL. 1.

[Nos. 1–25.]

1886-1896.

CONTENTS.

No. 1. A Preliminary List of North American Species of *Cyperus*, with Descriptions of new Forms. By N. L. Britton (1886).

No. 2. *Cerastium arvense* L., and its North American Varieties. By Arthur Hollick and N. L. Britton (1887).

No. 3. Plant Notes from Termiscouata County, Canada. By J. I. Northrop (1887).

No. 4. A List of Plants collected by Miss Mary B. Croft at San Diego, Texas. By N. L. Britton and H. H. Rusby (1887).

No. 5. New or Noteworthy North American Phanerogams—I. By N. L. Britton (1888).

No. 6. An Enumeration of the Plants collected by Dr. H. H. Rusby in South America, 1885–1886. Parts I–XXIII. By N. L. Britton. The account of the general features of the region traversed by Dr. Rusby; the algae and fungi determined by Prof. W. G. Farlow, the Lichenes by Dr. J. W. Eckfeldt, the Musci and Pteridophyta by Elizabeth G. Britton, the Hepaticae by Dr. Richard Spruce (1886–1896).

No. 7. The Genus *Hicoria* of Rafinesque. By N. L. Britton (1888).

No. 8. A recent Discovery of Hybrid Oaks on Staten Island. By Arthur Hollick (1888).

No. 9. A List of Plants Collected by Dr. E. A. Mearns at Fort Verde and in the Mogollon and San Francisco Mountains, Arizona, 1884–1888. By N. L. Britton.

The General Floral Characters of the San Francisco and the Mogollon Mountains and the Adjacent Region. By H. H. Rusby (1888).

No. 10. Contributions to American Bryology—I. By Elizabeth G. Britton (1888).

No. 11. Preliminary Notes on the North American Species of the Genus *Tissa* Adans. By N. L Britton (1889).

No. 12. The Genus *Eleocharis* in North America. By N. L. Britton (1889).

No. 13. New or Noteworthy North American Phanerogams—II. By N. L. Britton (1889).

No. 14. A List of State and Local Floras of the United States and British America. By N. L. Britton (1889).

No. 15. A Descriptive List of Species of the Genus *Heuchera*. By Wm. E. Wheelock (1890).

No. 16. New or Noteworthy North American Phanerogams—III. By N. L. Britton (1890.)

No. 17. The Flora of the Desert of Atacama. By Thos. Morong (1891).

No. 18. Contributions to American Bryology—II. By Elizabeth G. Britton (1891).

No. 19. Notes on North American Halorageae. By Thos. Morong (1891).

No. 20. New or Noteworthy North American Phanerogams—IV. By N. L. Britton (1891).

No. 21. Notes on the North American Species of Eriocauleae. By Thos. Morong (1891).

No. 22. New or Noteworthy North American Phanerogams—V. By N. L. Britton (1891).

No. 23. The American Species of the Genus *Anemone* and the Genera which have been referred to it. By. N. L. Britton (1891).

No. 24. Review of the North American Species of the Genus *Xyris*. By Heinrich Ries (1892).

No. 25. A Preliminary List of the Species of the Genus *Meibomia* occurring in the United States and British America. By Anna M. Vail (1892).

Put in Stack for me

CONTRIBUTIONS FROM THE HERBARIUM OF COLUMBIA COLLEGE.—No. 1.

A Preliminary List of North American Species of Cyperus, with Descriptions of New Forms.

BY N. L. BRITTON.

(Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. XIII., No. 11.)

A Preliminary List of North American Species of Cyperus, with Descriptions of new Forms.

BY N. L. BRITTON.

(A) Sub-genus PYCREUS, Beauv.

* *Umbel simple or capitate, rarely slightly compound.*

† Superficial cells of the achenium oblong.

1. *Cyperus flavescens*, L. Canada to Texas throughout eastern North America; also in northern Mexico, Brazil, southern Europe, northern Africa and western Asia.

† † Superficial cells of the achenium quadrate.

2. *C. diandrus*, Torrey. Throughout eastern North America, extending westward to Arkansas and New Mexico. (Fendler, No. 869.)

Var. *castaneus*, Torrey. (*C. Elliottianus*, Rœm. and Schultes, Mant. ii., p. 100.) With the type. I cannot agree with Mr. C. B. Clarke, (Journ. Linn. Soc., xxi., p. 65) in regarding this plant as a distinct species under the name *C. rivularis*, Kunth. The varieties *eluta* and *depauperata* which he proposes (l. c.) are, in my opinion, but forms of the variable *C. diandrus.* There is still another form, characterized by elongated spikelets, which has been collected by Hunter in Lincoln Co., N. C., and by Leggett at Summit, N. J.

Var. CAPITATUS, n. var. Inflorescence a single capitate cluster appearing somewhat lateral; involucre of one or two elongated leaves with one or two bracts; glumes generally brown-margined. Texas and northern Mexico to California. Here I include the var. *castaneus* of Watson in Botany of California, ii., p. 214; No. 1949 of C. Wright's New Mexican Collection, and No. 49a of Dr. Palmer's Chihuahuan Collection of 1885.

3. *C. bipartitus*, Torrey. New Orleans, La., (Dr. Ingalls in Torrey Herbarium.) This appears to be distinct, but more specimens are needed to establish its relationship; it may be but a single-spiked form or variety of *C. diandrus.*

4. *C. Nuttallii*, Eddy in Spreng. Neue Entdeck., i., p. 240; Torrey. In salt meadows along the Atlantic and Gulf coasts (Curtiss, N. A. Plants, 3050.) For synonomy see Torrey, Ann. Lyc., iii., p. 252. *C. Cleaveri*, Torrey, is but a depauperate, single spiked form, of this species.

5. *C. Olfersianus*, Kunth. Umbel very simple, 1 to few-rayed; heads composed of few straw-colored spikelets; achenium oblong, its surface marked with quadrate cells; otherwise resembling *C. flavescens*. Plaquemines Co., La., (A. B. Langlois, 1882); Mexico, West Indies and eastern South America.

6. *C. polystachyus*, Rottb. New Orleans, (Torrey Herbarium; an old specimen.) Widely distributed in tropical regions.

Var. *leptostachyus*, Bœckl. (*C. microdontus*, and *C. Gatesii*, Torrey, *C. Texensis*, Steud.) Virginia to Florida (Curtiss, N. A. Plants, No. 3049, part), and Texas, (E. Hall, 676.)

7. *C. leucolepis*, Carey, MS., fide Clarke l. c., p. 61, (not of Bœckl.; *C. divergens*, Chapm., not of HBK.) Quincy, Florida. Related to *C. pumilus*, L., of India.

8 *C. unioloides*, R. Br., var. *bromoides*, Clarke. Spikelets much larger than in any of the foregoing species, straw-colored. Cienaga, Los Angeles Co., Cal., (J. C. Oliver in Gray Herbarium); Mexico, West Indies and South America; the type in Australia.

* * *Umbel compound.*

9. *C. flavicomus*, Vahl, Torrey, Ann. Lyc., iii., 253, Bœckeler, not of Michaux. which, according to Mr. Clarke (l. c., p. 71), is *C. strigosus*, L. Virginia to Florida; also in Brazil.

10. *C. Hochstetteri*, Nees. (*C. flavicomus*, Torrey, Bot. Mex. Bound. Survey.) Glumes dark reddish brown; achenium broadly ellipsoidal, twice or three times the size of that of the foregoing species, which it otherwise resembles. Louisiana (Hale); Texas and New Mexico (C. Wright, No. 1965); also in tropical America, Australia, India and Africa.

(B) Sub genus JUNCELLUS, Griseb.

11. *C. lævigatus*, L. Southern California (Brewer, Lemmon, Wright, Parish, No. 1050.) Widely distributed in tropical regions.

(C) Sub-genus EUCYPERUS, Clarke.

Section 1. *Aristati*, Kunth.

* *Spikelets digitate.*

12. *C. amabilis*, Vahl. (*C. aureus*, *aurantiacus* and *oligostachyus*, HBK; *C. glarcosus*, Liebm.) Sanoita Valley, southern Arizona, (Rothrock, No. 599, in Expl. and Surveys West of

100th Meridian, under *C. Nuttallii*); Mexico, (Dr. Palmer, No. 49b, 1885); also in the West Indies, South America, eastern India and Africa.

⁂ *Spikelets in dense terminal clusters.*

13. *C. aristatus*, Rottb. (*C. inflexus*, Muhl; *C. confertus*, Chapm., S. Flora, not of Swartz.) Throughout North America, but local. (E. Hall, Pl. Oreg., 557, and Pl. Tex., 677.) Dr. Chapman's specimens from South Florida, marked *C. confertus*, differ mainly in the reddish-brown glumes, which is the character given by Clarke (l. c., p. 92), for his forma *versicolor*. The species is widely distributed in temperate and tropical regions, not, however, occurring in Europe.

14. *C. sesleroides*, HBK. Sanoita Valley, southern Arizona, (Rothrock, No. 614, Expl. and Surveys West of 100th Meridian); also in Mexico, Hartweg, No. 256; Liebmann; Parry and Palmer, Nos. 910, 911 and 911½; Chihuahua, Dr. E. Palmer, No. 49¾, 1885, named by me *C. spectabilis*, which appears to be a totally different plant. Specimens from various other Mexican localities in the Gray Herbarium very closely resembling those here cited are determined as *C. divergens*, HBK., which nearly related, if not identical species Bœckeler and Clarke refer to *C. spectabilis*, Schreb. Following these authorities I was led into error in my determination of Dr. Palmer's plant.

Section 2. *Compressi*, Kunth.

15. *C. compressus*, L. Maryland and southward along the Atlantic and Gulf coasts to Texas (Curtiss, N. A. Plants, No. 3026; E. Hall, Pl. Tex., 682); also in ballast at Camden and Philadelphia; Mexico and Central America and in the warmer portions of Asia and Africa.

16. *C. Rusbyi*, Britton in Bull. Torr. Bot. Club, xi., p. 29. Near Silver City, New Mexico, Dr. H. H. Rusby, 1880.

17. *C. Buckleyi*, Britton. Valley of the Lower Rio Grande, (Buckley); rocky hills near Chihuahua (Pringle, Plantæ Mex., 1885, No. 311); Indian Terr. (E. Palmer, 347).

18. *C. Schweinitzii*, Torrey. Western Pennsylvania and Canada to Texas and Arizona (Lemmon, No. 2905); westward to the Pacific coast, extending north to Oregon (Geyer); also in Mexico, (Parry and Palmer, 907).

Var. DEBILIS, n. var. Much smaller and more slender, about 6-8 inches high; inflorescence very simple; spikelets few flowered; glumes blunt, strongly nerved. Arizona and New Mexico (C. Wright, No. 1944; Rusby, No. 430, Coll. of 1880); also in Mexico (Bourgeau, No. 529.)

19. *C. Fendlerianus*, Bœckl. Texas, Arizona and New Mexico (Fendler, No. 865; C. Wright, No. 1945; Rusby; Matthews; also Hall and Harbour, Rocky Mountain Flora, No. 584,)

Section 3. *Viscosi*, Clarke.

20. *C. viscosus*, Aiton. (*C. trachynotus*, Torrey.) Florida to New Mexico (Nos. 1943 and 704, C. Wright; No. 1515, Mex. Bound. Survey); Mexico, West Indies and northern South America.

Section 4. *Luzuloidei*, Kunth.

21. *C. Luzulæ*, Rottb., var. UMBELLULATUS, n. var. (*C. vegetus*, Pursh, Muhlenberg, Elliott, Torrey, Chapman, &c., not of Willd.; *C. virens*, Gray, Manual, not of Michaux; *C. distinctus* and *pseudo-distinctus*, Steud.); Delaware (Canby) to Florida (E. Palmer, No. 586, 1874), and westward through the Gulf States to Texas (Lindheimer, No. 201), the Indian Territory and Arkansas. Differs from the type mainly in the compound inflorescence. Specimens received from Mr. Ravenel, collected at Aiken, S. C., closely approach the type, which occurs in Mexico, the West Indies and South America, (Mart. Herb. Flor. Brazil, No. 245.)

22. *C. virens*, Michx. North Carolina to Florida (Curtiss, N. A. Plants, No. 3062), and westward through the Gulf States to Texas (E. Hall, No. 680); also in Mexico and Guatemala, (fide Hemsley); California (vide Watson, Bot. Cal., ii., p. 214.)

23. *C. Surinamensis*, Rottb. (*C. Drummondii*, Torrey); Florida, (Curtiss, N. A. Plants, No. 3032) to Texas; in ballast grounds, Camden, N. J., (Parker); also in Mexico, the West Indies and South America.

24 *C. ochraceus*, Vahl. (*C. formosus*, Vahl (?), vide Torrey in Ann. Lyc., iii., p. 269; *C. aureus* (?), Britton in Bull. Torr. Bot. Club, xi., p. 85) Abbeville, La. (Langlois, distributed as No. 855c); Texas (Buckley), and in the West Indies and Mexico (Botteri, Nos. 739, 740); Mex. Bound Survey, No. 1519.

25. *C. serrulatus*, Watson. Placer Co., Cal., G. R. Vasey; Alta, Cal., Pringle; Sacramento, M. E. Jones, Flor. Cal., 3530.

26. *C. reflexus*, Vahl. (*C. rufescens*, Torr. and Hook.) Texas, (Drummond; E. Hall, No. 679, in part; Wright; Nealley.) Specimens recently received from Mr. Nealley show that the scales are not always red, and that the spikelets may be as many as 30-flowered.

27. *C. cyrtolepis*, Torr. and Hook. Texas Drummond, Wright, Mex. Bound. Survey, No. 1520, E. Hall, 678 in part, Buckley, Reverchon); Camp Grant, Arizona, (Rothrock, Exp. and Surv. W. of 100th Merid., 390); Indian Terr., (Palmer 351.)

Var. DENTICARINATUS. (*C. rufescens*, var. *denticarinatus*, Britton in Bull. Torr. Bot. Club, xi., p. 85.) After a re-examination of Mr. Buckley's specimens from the valley of the lower Rio Grande, I am convinced that they belong rather to this species than to *C. rufescens*.

28. *C. acuminatus*, Torr. and Hook. Illinois and Tennessee to Louisiana, Kansas and Arizona; also collected by Howell (No. 567) along the Columbia River in Oregon, and by J. W. Congdon in Tulare Co., Cal. A form of this species collected by E. Hall at Hempstead, Texas (Pl. Tex., 679), has dense heads of many spikelets.

Section 5. *Haspani*, Kunth.

29. *C. Haspan*, L. Virginia, North Carolina (Curtis, Canby), to Florida (Curtiss, N. A. Plants, No. 3041), and westward to Texas (E. Hall, No. 683); also occurring in Mexico, the West Indies, South America, Africa, Asia and Australia.

30. *C. dentatus*, Torrey. Cumberland Co., Maine (J. Blake), Rhode Island and northern New York (Leggett), to South Carolina, mainly near the Atlantic coast, but extending westward to West Virginia (Mertz.)

31. *C. Lecontei*, Torrey. Florida (Curtiss, N. A. Plants, No. 3045) to Louisiana.

Section 6. *Fusci*, Kunth.

32. *C. lateriflorus*, Torrey. East of Santa Cruz, Sonora, (C. Wright, No. 1950.) Not since collected. The species is nearly allied to *C. difformis*, L., of the tropical regions of the Old World, and may be the same.

33. *C. Iria*, L. Santee Canal, South Carolina (Ravenel; Curtiss, N. A. Plants, No. 3043.) According to Dr. Chapman it was probably introduced from eastern Asia, where, as elsewhere in warm-temperate countries, it is a noxious weed in rice fields.

34. *C. fuscus*, L. In ballast sand, Camden (Parker); Revere Beach, Mass. (H. A. Young, in Gray Herbarium.) Adventive.

Section 7. *Glomerati*, Clarke.

35. *C. cephalanthus*, Torr. and Hook. Texas (Drummond, 3d Coll., No. 445); Louisiana (Carpenter, Langlois.)

36. *C. spectabilis*, Schreb. Texas (Drummond, in Calcutta Herbarium, fide Clarke, l. c., p. 142.) Arizona, (Rothrock, 600 and 601, in Expl. and Surveys W. of 100th Meridian.) (See No. 14 of this List.)

37. *C. distans*, L. Eastern North Carolina (Gerald McCarthy, 1885.) The species was recorded from the same region by Pursh (Flor. Amer., Sept., i., p. 53) and its rediscovery by Mr. McCarthy confirms Pursh's statement that it grows "in wet woods, Carolina and Georgia." It is widely distributed in tropical countries.

Section 8. *Corymbosi*, Kunth.

* *Culm jointed, leafless.*

38. *C. articulatus*, L. South Carolina and Florida (Curtiss, N. A. Plants, No. 3024) to Texas along the Gulf Coast (E. Hall, No. 703.) In all tropical regions.

Var. *conglomeratus*, Britton. Valley of the lower Rio Grande (Buckley.)

A form of this species with the spikelets greatly elongated has been collected by Mr. Nealley in Texas.

* * *Culms leafy.*

† Perennial by tuberiferous stolons.

39. *C. rotundus*, L. North Carolina to Florida (Curtiss, N. A. Plants, No. 3055) and Texas (E. Hall, 684); also in ballast grounds at Jersey City (Brown), Philadelphia and Camden (Parker), and at Port Eads, La., (Langlois); throughout the warmer regions of the globe. For synonomy see Clarke, l. c., p. 162.

40. *C. esculentus*, L. (*C. phymatodes*, Muhl.; *C. repens*,

Ell.) New Brunswick (Fowler) and Wisconsin to Florida (Curtiss, N. A. Plants, No, 3052) and Texas throughout eastern North America; westward to California and extending northward along the Pacific coast to Alaska (J. O. Rainer, 1871); also in Mexico, South America, southern Europe to the Cape of Good Hope, and in Australia.

Var. *macrostachyus*, Bœckl. (*C. lutescens*, Torr. and Hook, Ann. Lyc., iii., 433). Florida (Chapman), Texas (C. Wright, 1849, No. 705; Drummond, 3d Coll., No. 452), San Diego, Cal., (Orcutt, No. 1314.)

Var. ANGUSTISPICATUS, n. var. Spikelets narrowly linear, about one line wide and three-fourths of an inch long; a well-marked form. Kentucky (Short), Missouri (H. Eggert), Washington, D C., (Vasey), Lexington Co., S. C., (J. Donnell Smith.)

Var. HERMANNI. (*C. Hermanni*, Buckley; *C. phymatodes*, var. *Hermanni*, Watson). Kern River, Cal., (Blake, in Torrey Herbarium); Bank of San Joaquin (Lemmon, Flor. Cal., 1509.)

41. C. HALLII, n. sp. Culm triangular, 2 to 3 feet high; leaves elongated, 2 to 3 lines wide; involucre of several leaves, one of them elongated far beyond the others and reaching a length of a foot or more; umbel more or less compound, of 5 or 6 elongated rays and several shorter ones; involucels setaceous; spikelets linear, 9 to 15-flowered, arranged in loose heads; glumes ovate, acute, strongly 7 to 9-nerved, dark reddish-brown, with lighter colored margins and apices; achenium triangular, linear. Rootstocks scaly.

Texas (E. Hall, Pl. Tex., No. 685, distributed as *C. phymatodes*, var.); valley of the lower Rio Grande (Buckley); Indian Territory (E. Palmer, No. 353).

† † Annual or perennial; roots fibrous, but stems often hard and corm-like at the base.

42. *C. strigosus*, L. (*C. Michauxianus*, Schultes, not of Torrey, fide Bœckeler; *C. flavicomus*, Michx., not of Vahl; *C. stenolepis*, Watson, Bot. Cal., not of Torrey.) Canada and Minnesota to Florida (Curtiss, N. A. Plants No. 1820, distributed as *C. stenolepis.*) and Texas, throughout eastern North America; also in California. Among the many forms of this variable species I think the following may be distinguished:

Var. *robustior*, Kunth, Enum., ii., p. 88. Spikelets large, elongated, 10 to 25-flowered. With the type.

Var. *capitatus*, Bœckl., Linnæa, xxxvi., p. 347. Inflorescence of several capitate clusters, rays short. Indiana (Dr. Clapp, 1838); St. Louis, Mo., (Engelmann); Illinois (Dr. Schneck); Massachusetts (Morong); Camden, N. J., (Martindale); Texas, (Bigelow.)

Var. COMPOSITUS, n. var. (*C. strigosus*, var. Torrey, Ann. Lyc., iii., p. 262.) Umbel compound; spikelets one-third to one-half inch long, 4 to 5-flowered. Astoria, Long Island (Leggett); Pennsylvania and New Jersey to Alabama.

Var. GRACILIS, n. var. Slender, leaves shorter than the culm, umbel of 1–3 short rays, bearing few, linear, spreading spikelets. Valley of the Lower Rio Grande (Buckley); Fayetteville, Ark., (Harvey.)

Var. ELONGATUS. (*C. Michauxianus*, var. (?) *elongatus*, Torrey, Ann. Lyc., iii., p. 432 (?). Rays much elongated, bearing single, capitate clusters. North Carolina (Curtis, in Torrey Herb.) The originals of Dr. Torrey's variety were collected by Drummond in Texas, but there are no specimens from there in his herbarium, and I have no means of knowing if they are the same as the one from North Carolina on which the present variety is based.

43. *C. stenolepis*, Torrey. North Carolina to Florida and Texas.

44. *C. setigerus*, Torr. and Hook. (Including *C. lutescens*, Torrey, Bot. Mex. Bound. Survey, p. 227, and Herbarium.) Texas and New Mexico (C. Wright, No. 705; Buckley; Bigelow, and Herb. Berland. Texano-Mexicanum, Nos. 2410 and 980.) I can see no reason for keeping the two species separate, and Dr. Torrey states (l. c.) that his *C. lutescens* is probably too close to *C. setigerus*.

45. *C. sphacelatus*, Rottb. Southern Nevada (Lieut. Wheeler, 1871, in Gray Herbarium); Cal. (Parish); ballast, Mobile, Ala., (Mohr.); the specimens almost exactly match the others from St. Thomas, W. I. (Eggers), and No. 636, Sagot, Guyane Francaise. Resembles the last, but the glumes are brown-margined.

46. *C. refractus,* Engelm. (Bœckeler, in Linnæa, xxxvi., p. 369; see also Vasey, in Bull. Torr. Bot. Club, x., p. 32.) Trenton, N. J., to North Carolina and Missouri. Appears to me nearest allied to *C. strigosus,* but is also related to *C. Lancastriensis,* Porter.

47. *C. filiformis,* Swartz. Southern Florida; also in the West Indies. The Florida specimens do not quite agree with C. Wright's from Cuba.

48. *C. brunneus,* Swartz. (*C. purpurascens,* Vahl; *C. ligularis,* Chapm., S. Flora, p. 507, not of L. nor of Chapm. Suppl., p. 659.) Southern Florida (Curtiss, N. A. Plants, No. 3025*), and in the West Indies.

49. *C. tetragonus,* Ell. North Carolina and Florida (Curtiss, No. 3059) to Texas; also in Mexico (fide Hemsley.)

50. *C. dissitiflorus,* Torrey. Florida to Louisiana and Texas. (E. Hall, Plantæ Texanæ, No. 690, distributed as *C. litos,* Schultes); also in Mexico and Brazil (fide Bœckeler.)

Section 9. *Papyri,* Kunth.

51. *C. giganteus,* Vahl. (*C. erythrorhizos,* Muhl., var. *erectus,* Britton, in Bull. Torr. Bot. Club, xi., p. 85; *C. densiflorus,* Meyer.) Texas and Mexico (Herb. Berland. Texano-Mexicanum, Nos. 876, 3223 and 2306; Buckley; Nealley.) Cuba (C. Wright, No. 1529.)

52. *C. erythrorhizos,* Muhl. Lawrence, Mass., (Robinson); Hartford, Conn., (fide Bishop, Cat. Plants Conn., p. 17); eastern Long Island (E. S. Miller); Camden, N. J., (Martindale), and southward to Florida and New Mexico; also in California.

Var. *pumilus,* Engelm. (*C. occidentalis,* Torrey.) Missouri to California, extending northward to Oregon (E. Hall, Pl. Oreg., No. 558), and Washington (Suksdorf, 221.)

53. C. HALEI, Torrey, ined., in letter to Mr. Charles Mohr, 1868, who has kindly furnished me with the following description:

Umbels many-rayed, shorter than the involucral bracts; spikes cylindrical, one-half to three-fourths inch long, sessile or stalked, forming dense clusters with a few linear, acuminate involucels; spikelets flat, 12 to 14-flowered; scales with scarious margins, brown, sharply carinate on the back, indistinctly

5-nerved, blunt, mucronulate, somewhat appressed; stem 2 to 3 feet high, obtusely triangular, tumid at the base; leaves as long as the stem, broadly linear, very rough on the edges; achenium small, triquetous. Marshes and borders of lakes in the Red River Valley, Repides, La., (Hale); eastern Florida (Leavenworth); Carrabelle, Florida.

(D) Sub-genus DICLIDIUM, Nees.

54. *C. speciosus*, Vahl; Torrey in part. (*C. Michauxianus*, Torrey, not of Schultes.) New England to Wisconsin, and southward to Florida (Curtiss, N. A Plants, No. 3048) and Texas (C. Wright, 1849, No. 706); also in California.

Var. SQUARROSUS, n. var. (*C. ferruginescens*, Bœckl.) Scales spreading or recurved, reddish. New Mexico (Fendler, No. 870); St. Louis, Mo., (Engelmann); Texas (Buckley.)

Var. PARVUS, n. var. (*C. parvus*, Bœckl.) Low, 1 to 3 inches high; umbel very simple, generally of a single cluster of short terete spikelets. Cited by Bœckeler as collected by Dr. Engelmann at St. Louis, and Drummond's Collection, No. 34; No. 1946, C. Wright, New Mexico, answers Bœckeler's description.

55. *C. ferax*, Richard. (*C. flexuosus*, Vahl; *C. pennatus*, Bœckl., not Lam.) Missouri (F. Bush); Texas (Bigelow, Buckley); Arizona (Pringle); California (Parish, 1064); West Indies and widely distributed in tropical regions. For synonomy see Clarke, Journ. Linn. Soc., xx, p. 295.

56. *C. Engelmannii*, Steud. Massachusetts (Morong) to Wisconsin and southward, but not often collected.

57. *C. oxycarioides*, Britton, in Bull. Torr. Bot. Club, xi., p. 86. Valley of the lower Rio Grande (Buckley.)

(E) Sub-genus MARISCUS, Vahl.

* *Umbel simple or capitate.*

† Spikelets few (2 to 6), flowered.

58. *C. ovularis*, Torrey. Southern New York to Illinois and southward; westward to Arkansas and Texas.

Var. *robustus*, Bœckl. Heads larger, 6 to 8 lines in diameter, on longer rays; spikelets 3 to 6-flowered. (*C. Wolfii*, Wood, in Bull. Torr. Bot. Club, vi., p. 72.) Illinois (Bebb; J. Wolf);

Arkansas (Harvey); Indian Territory (G. D. Butler); Louisiana (Langlois).

Var. *sphæricus*, Bœckl. Heads smaller than in the type, very dense; spikelets more subulate, reddish brown. Arkansas (Dr. Pitcher); Indian Territory (Dr. Palmer, No. 348); Texas (Wright) and Herb. Berland. Tex. Mex., Nos. 314, 1568 and 1574.)

59. C. TORREYI. (*Mariscus cylindricus*, Ell.; *C. ovularis*, var. *cylindricus*, Torrey; *C. cylindricus*, Britton, l. c., vii., p. 48, Plate III., not of Chapman.) Long Island (Leggett) to Florida (Curtiss, N. A. Plants, No. 3051), and westward to Texas (Palmer, Flor. S. W. Texas, No. 2017.)

60. *C. retrorsus*, Chapm. in Bot. Gazette, iii., p. 17; *C. retroversus*, Chapm., Suppl., p. 659; *M. alternifolius*, Vahl.) Robert's Key, Caximbas Bay, southern Florida (Chapman); also in Mauritius.

61. *C. retrofractus*, Gray. Southern New Jersey to Florida (Curtiss, No. 3053), and Texas (E. Hall, Plantæ Texanæ, No. 691.)

62. *C. flavomariscus*, Griseb., Flor. Brit. W. I., p. 567. (*Mariscus flavus*, Vahl; *C. flavus*, Bœckl.) Valley of the lower Rio Grande (Buckley); Monterey, Cal. (?), vide Watson, Bot. Cal., ii., p. 216; in ballast at Philadelphia and Camden (Parker, Burk); also in Mexico, the West Indies and South America.

Var. PEDUNCULARIS, n. var. Rays of the umbel elongated, with setaceous involucels. Chihuahua (Dr. E. Palmer, No. 49, 1885; Mandon, Plantæ Andium Bolivensium, No. 1398.)

63. *C. cylindricus*, Chapm, not of Britton. Colier's Key, Marco Pass, South Florida (Chapman.)

64. *C. uniflorus*, Torr. and Hook. Texas (Drummond, Wright, E. Hall, No. 686, Reverchon, Nealley.)

Var. *pumilus*, Britton. Indian Territory (Dr. Palmer, No. 350); valley of the lower Rio Grande (Buckley.)

65. C. WRIGHTII, n. sp. Culm slender, triangular, 12 to 15 inches high; leaves of the culm few, narrowly linear; root leaves not seen; involucre of one elongated leaf, and 2 to 4 shorter ones; umbel simple, of 1 to 3 short rays; inflorescence of 1 to

3 dense ovate heads, about half an inch long; spikelets lanceolate, 4 to 5-flowered; glumes lanceolate, acute; achenium ovoid, triangular.

New Mexico (C. Wright, No. 1947); Mexico (F. Müller, without a number).

†† Spikelets several (4 to 12) flowered.

66. *C. filiculmis*, Vahl. Northumberland Co., Canada (Macoun), to Wisconsin and southward to Florida (Curtiss, No. 3036) and Texas. Varies into very slender forms with small, single heads.

67. *C. Grayii*, Torrey. (*C. setifolius*, Torrey MS., and Clarke, l. c., xxi., p. 198.) Sandy plains along the Atlantic coast, Massachusetts to Florida. *C. ovularis*, var. *tenellus*, Torrey, Ann. Lyc., iii., p. 279, is a young form of this.

68. *C. Baldwinii*, Torrey. North Carolina and Florida, (Curtiss, No. 3025) westward to Texas (E. Hall, No. 687; E. Palmer (Flor. S. W. Texas, No. 1332); also in ballast at Camden (Parker.)

69. *C. Lancastriensis*, Porter. Trenton, N. J.; Safe Harbor, Penn., (Porter) to Alabama.

70. *C. fuligineus*, Chapm. Key West (Chapman; Garber.)

* * *Umbel compound.*

71. *C. Californicus*, Watson. (*C. speciosus*, Torrey, Bot. Mex. Bound. Survey.) California (Fitch, in Torrey Herb.)

72. *C. Pringlei*, Britton. Catalina Mountains, southern Arizona (Pringle.)

73. *C. ligularis*, L. (Not of Chapm., S. Flora, p. 507.) Southern Florida (Palmer, 1874, No. 532; Curtiss, N. A. Plants, No. 3046); also in Mexico, the West Indies, South America and tropical Africa and Australia.

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CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 2.

Cerastium arvense, L., and its North American Varieties.

BY ARTHUR HOLLICK AND N. L. BRITTON.

(Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. XIV., No. 3.

W. G. FARLOW.

Cerastium arvense, L., and its North American Varieties.

BY ARTHUR HOLLICK AND N. L. BRITTON.

Plates LXIII–LXV.

While botanizing on Staten Island, New York, during the past ten or twelve years, our attention was frequently attracted by a *Cerastium*, which grows abundantly at many places on the serpentine hills, and in no other parts of the Island. This plant agrees in general with the description of *C. oblongifolium*, Torrey, in the Flora of the State of New York, and yet it exhibits such a variety of forms that we were led to collect a large number of specimens and memoranda for comparison. The further the subject was investigated the more interesting it became to us, and finally resulted in the study of not only this plant, but of allied forms from other places. Our studies have resulted in the conclusion that the Staten Island plants are more properly to be regarded as a variety of *C. arvense*, L., and that many other American forms of *Cerastium* are to be referred to varieties of this species, as modified by climate, soil, etc.

In addition to specimens in our own collections and those in the herbarium of Columbia College, others from the following herbaria have been kindly placed at our disposal: Harvard University, United States Department of Agriculture, Academy of Natural Sciences of Philadelphia, and Torrey Botanical Club. In addition to these, we have received specimens and notes from Prof. T. C. Porter, Mr. C. E. Smith, Mr. W. M. Canby, Mr. J. M. Macoun, Dr. J. C. Arthur, Prof. S. M. Tracy, and others.

The following is our proposed arrangement of the North American forms of the species:

CERASTIUM ARVENSE, L. Leaves linear or narrowly lanceolate; those of the stem distant; stem and leaves hairy or nearly smooth; bracts small; capsule equaling or somewhat exceeding the calyx. (Plate LXIV., f. I.)

Spec. Plant., Ed. i., 438; Ed. ii., 628; Ed. iii., 628; Fenzl., in Ledeb. Fl. Ross., i., p. 412; DC., Prodr., i., 419; Syn. Flor. Gall., 395; Hudson, Fl. Angl., 201; Engl. Bot., Pl. 93; Benth., Handbook Brit. Fl., i., 126; Koch, Syn. Flor. Germ., 135; Reichb., Icon. Fl. Germ., vi., Pl. 234, f. 4980; Ettingshausen & Pokorny, Phys. Pl. Austr. ix., Pl. 889; Hartm., Handb. Skand. Flor., 132; Boiss., Flor. Orient., i., 728; Regel, Fl. Ost. Sib., i., 427 and 444; Gay, Fl. Chil., i., 276; Rohrb., Linnæa, xxxvii., 303.

Hook., Fl. Bor. Am., i., 104; Muhl., Cat., 46; Bigel., Fl. Bost., 196; Torrey & Gray, Fl. N. A., i., 188; Eaton & Wright, 188; Torrey, Fl. N. Y., i., 99; Bot. Wilke's Exp., 246; Engelm., Trans. Amer. Phil. Soc., xiii, 186; Beck, Bot., 54; Gray, Pac. R. Rep., xii., 41; Amer. Journ. Sci. (II.), xxxiii., 405; Proc. Phil. Acad., 1863, 59; Manual, 94; Wood, Classbook, Ed, 1855, 188; Bot. & Flor., 55; Cooper, Pac. R. R. Rep., xii., 57; Chapman, 50; Darby, 247; Meehan, Flowers and Ferns, ii., pp. 189–192, excl. figure.

Porter, Hayden's Rep., 1870, 473; 1871, 479; Porter & Coulter, Fl. Col., 13; Watson, King's Rep., v., 38 and 417; Bot. Cal., i., 67; Rothrock, Geog. Surv. W. 100th Merid., vi., 71; Willis, Cat. N. J., 12; Britton, Prel. Cat. N. J. Fl., 16; Coulter, Bot. Rocky Mount. Reg., 33; Macoun, Cat. Plants Can., i., 77.

C. incanum, Ledb., Mem. Acad. St. Petersb., v., 540 (fide Regel).

? *C. hybridum*, Muhl., Ind. Fl. Lanc., in Trans. Am. Phil. Soc. (I.) iii., 170.

C. Pennsylvanicum, Hornem., Hort. Hafn., 435; D C., Prodr. i., 420; Spreng., Syst. Veg., ii., 418; Don. Gard. Dict., i., 446.

C. elongatum, Nutt., Journ. Acad. Sci., Phil., vii., 16. ?

C. tenuifolium, Pursh., Fl. Amer. Sept., 321.

Habitat. Throughout northern North America, extending southward along the Alleghanies and the Rocky Mountains; also in the Andean region of South America and in Patagonia. Throughout northern and central Europe and northern Asia.

Var. LATIFOLIUM, Fenzl. Leaves lanceolate to oblong-lanceolate, shorter and broader than in the type; those of the stem closer; stems low, 3 to 8 inches high, pubescent. (Plate LXV., f. 5.)

Var. *latifolium*, Fenzl., and var. *alpicolum*, Fenzl., in Ledb. Flor. Ross., i., 412; Regel, Flor. Ost. Sib., i., 445.

C. strictum, L., Spec. Plant., 3d Ed., 529; D C., Prodr., i., 419.

C. ciliatum, Reich., Icon. Flor. Germ., vi., Pl. 235, f. 4981.

C. pubescens, Goldie, Edin. Phil. Journ., 1822; Richards, Frank. Journ., ed. 2, p. 18; DC., Prodr., i., 420.; Don. Gard. Dict., i., 447.

C. Pennsylvanicum, Hook., *fide* spec. in Herb. Acad. Nat. Sci., Phil.

? *C. arvense*, Richards, Franklin Journey, 10.

Habitat. Arctic and alpine regions of Europe, Asia and North America. Labrador (Steinhaur, Kreuth, in Herb. Gray); Utah (L. F. Ward, No. 539, 1875); Pike's Peak, Colo. (Parry) Franklin

Expedition (Hooker l. c.); and credited by Regel to "Ross Colonie," N. W. America (l. c.); Cent. Utah (Parry, Nos. 5 and 6, 1875); Mts. of Colo., 1872 (Torrey); Clear Creek Station, Col. (Newberry).

Var. ANGUSTIFOLIUM, Fenzl. Leaves elongated, linear or narrowly linear-lanceolate; stems pubescent, hoary or glandular. (Plate LXV., f. 7.)

In Ledeb. Fl. Ross., i., 413; Regel, Flor. Ost. Sib., i., 445.

C. arvense, Hook., Lond. Journ. Bot., vi., 75.

C. elongatum, Pursh, Fl. Amer., Sept., i., 321; DC. Prodr., i., 417; Spreng., Syst. Veg., ii., 417; Hook., Flor. Bor. Amer., i., 103.

Habitat. Northern Asia and northwest America. Oregon (Geyer, 284).

Var. MAXIMUM, n. var. Plants strong and stout, 12 to 20 inches high; leaves broadly linear to lanceolate, 2 to 4 lines wide, 1 to 2 inches long, acutish; capsule 1½ times the length of the calyx; lower bracts generally foliaceous. (Plate LXIV., f. 2.)

Habitat. Noyo, Mendocino Co., California (Bolander, Nos. 4723 and 6520); western California (G. R. Vasey), near San Francisco (Mrs. M. K. Curran).

Var. OBLONGIFOLIUM, n. var. Leaves narrowly or broadly oblong, or lanceolate-oblong, mostly obtuse; capsules 1½ to 2½ times the length of the calyx; stems generally taller and stronger than in the type; pubescent. (Plates LXIII., and LXV., f. 6.)

Cerastium, n. sp., Torrey, Amer. Journ. Sci., iv., 63.

C. oblongifolium, Torrey, Fl. U. S., i., 460; Fl. N. Y., i., 99; Darlingt., Florula Cestr., 54, and Fl. Cestr., 3d Ed.. 33, in part; Torrey and Gray, Fl. N. A., i., 188, in part; Gray, Man., 94; Wood, Class-book, 188, in part; Bot. & Flor., 55; Beck, Bot., 54?; Tatnall, Cat. Phen. & Fil. Plants, Newcastle Co., Del., 17; Newberry, Cat. Plants, Ohio, p. 14; Porter, in Mombert's Auth. Hist. Lanc. Co., Pa., 583; Walling and Gray's New Topog. Atlas, Penn., 25; Macoun, Cat. Plants Canada, i., 77; Anderson, in Rep. State Mineralogist, Nevada, 118; Meehan, Flowers and Ferns, ii., pp. 189 192; Coulter, Cat. Plants, Indiana, 4; Hollick and Britton, Fl. Richmond Co., N. Y., 8; Patterson, Cat. Plants, Ill., 7; Arthur, Contr. Fl. Iowa, 9; Upham, Cat. Fl. Minn., 32; Ward, Bull. U. S. Nat. Museum No. 22, 68; Tracy, Cat. Plants, Missouri, 15.

C. dichotomum, Muhl., Cat., 46. ?

? *C. bracteatum*, Raf., Proc. Decouv., 36; Poir., Suppl. v., 601; DC., Prodr., i., 420; Don. Gard. Dict., i., 447; Torrey and Gray, Fl. N. A., i., 189.

Habitat. Eastern United States from Virginia to New York;

near Alexandria, Va. (A. H. Curtiss); Washington, D. C. (Vasey, Ward); Montgomery Co., Md. (J. D. Smith); Newcastle Co., Del. (Canby, Commons); Lancaster Co., Penn. (Porter); eleven miles west of Philadelphia (C. E. Smith); and abundant on the hills of Staten Island, N. Y.; also extending westward to the Sierra Nevada; Sandusky, Ohio (Douglass); Ogle Co., Ill. (Bebb); Dixons, Ill. (Vasey); Decorah, Iowa (Holway); Amherstburgh, Ontario (Macoun); Belleville, Ontario (Mrs. Roy); Santa Magdalena Mts., N. M. (G. R. Vasey); near Bozeman, Montana (Scribner).

In the eastern United States, from southern New York to Maryland, this variety is apparently confined to magnesian rocks. On Staten Island it is certainly restricted to the serpentine area; with regard to the Pennsylvania localities, Mr. C. E. Smith writes: "So far as I know or have ever heard, it is unknown in our district (Philadelphia), except in one spot about eleven miles west of the city, where the road to West Chester crosses the serpentine rocks, where it is plenty;" and we have examined a specimen of Dr. Darlington's collecting, marked "Serpentine hill, Westchester, Pa.," while in his "Flora Cestrica," he remarks, "Banks of serpentine rock, frequent;" as to the Delaware stations, Mr. W. M. Canby says, "I do not know of its growing elsewhere in this State, nor anywhere in this region (Newcastle Co.), except on the serpentine, where it is very plentiful," and Mr. A. Commons collected it "on serpentine rock, Centreville, Del." It also appears to grow in other places on magnesian limestone, though we have not been able to verify this to any extent; specimens have been seen by us marked "Banks of Susquehanna, Lancaster Co., Pa., T. C. Porter;" and Professor Porter has sent us specimens from the vicinity of Easton, Penn., at both of which localities magnesian limestone occurs; and the original of Dr. Torrey's *C. oblongifolium* came from a region of magnesian limestone near Sandusky, Ohio. Further south and west than these points we have thus far been unable to follow this interesting association.

In this connection we have thought it a matter of some interest to present the following analysis of the ash of this plant, from specimens collected on Todt Hill, Staten Island, kindly made for us by Mr. Ernest J. Lederle, of the School of Mines:

Silica (Si O_2)	39.85
Alumina and Oxide of Iron (Al_2O_3 and Fe_2O_3)	18.58
Lime (Ca O)	9.35
Magnesia (Mg O	19.79

From this it is seen that the magnesia constitutes about one-fifth of the entire ash of the plant, and is present in larger quantity than any other constituent except the silica.

It should be remarked that the specimens seen from about Washington, D. C., and from Montgomery county, Md., are larger than those from the serpentine areas. The same may also be said of the specimens from Amherstburgh, Ontario, said by Mr. Macoun to grow in "damp woods," and also of those from the West. In some respects these approach the forms referred by us to var. *maximum*.

In Meehan's "Native Flowers and Ferns of the United States," Vol. ii., plate 48, is an illustration of one of these large forms, made from a specimen collected in Bergen Park, Colo., at an altitude of 7,000 feet. If this drawing is correct, it very nearly represents our var. *maximum*, but we have not seen any specimens of this from the Rocky Mountain regions.

Between Dr. Torrey's original description in the American Journal of Science and Arts, in 1822, and his later description in the Flora of the State of New York, published in 1843, there is the following discrepancy: In the former the leaves are described as *acute*, and the capsules as *shorter than the calyx*, while in the latter the leaves are described as *mostly obtuse*, and the capsules as *about twice as long as the calyx*. This is, perhaps, to be accounted for by the original imperfect material. The latter description agrees with the characters of our var. *oblongifolium*.

Var. VILLOSUM, n. var. Stem leaves lanceolate to ovate-lanceolate; capsules 2 to 2½ times the length of the calyx; the whole plant densely villous-pubescent. (Plate LXV., f. 8.)

C. villosum, Muhl., Cat., 46; Darlingt., Flor. Cestr., 2d Ed., 279.

C. hirsutum, ? Darlingt., Florula Cestr., 54. ?

C. oblongifolium, Darlingt., Flor. Cestr., 3d Ed., 33, in part; Torr. & Gray, Fl. N. A., i., 188, in part.

Habitat. On serpentine rocks, Lancaster Co., Penn. (Porter);

Chester Co., Penn. (Kilvington, in Herb. Acad. Nat. Sci., Phil.)

This variety is to be regarded as the extreme broad-leaved and hairy form of the species. Its range appears to be restricted to the serpentine barrens of Pennsylvania, where it apparently passes gradually into the var. *oblongifolium.*

Var. FUEGIANUM, Hook., f. Low; smooth; leaves short, small, coriaceous and imbricated, lanceolate to ovate-lanceolate in outline; pedicels solitary, or in few-flowered cymes; capsules somewhat exceeding the calyx. (Plate LXIV., f. 3.)

C. arvense, var. ——, Coulter, in Hayden Rep., 1872, 762, name only.

Collected by Professor J. M. Coulter, Aug. 11th, 1872, at Lower Fire Hole Basin, Yellowstone Park.

This interesting form is identical with the var. *Fuegianum*, Hook. f., in Bot. U. S. Expl. Exp., i., 129 (our Plate LXIV., f. 4), from Fuegia, with specimens of which we have compared it.

As analagous to this remarkable distribution we have that of *Carex Magellanica*, Lam., whose range in North America is from the arctic regions to northern Pennsylvania and Utah.

EXPLANATION OF THE PLATES.

Plate LXIII.—*Cerastium arvense*, L., var. *oblongifolium*, drawn from a living plant collected on Todt Hill, Staten Island, New York, May 26th, 1886.

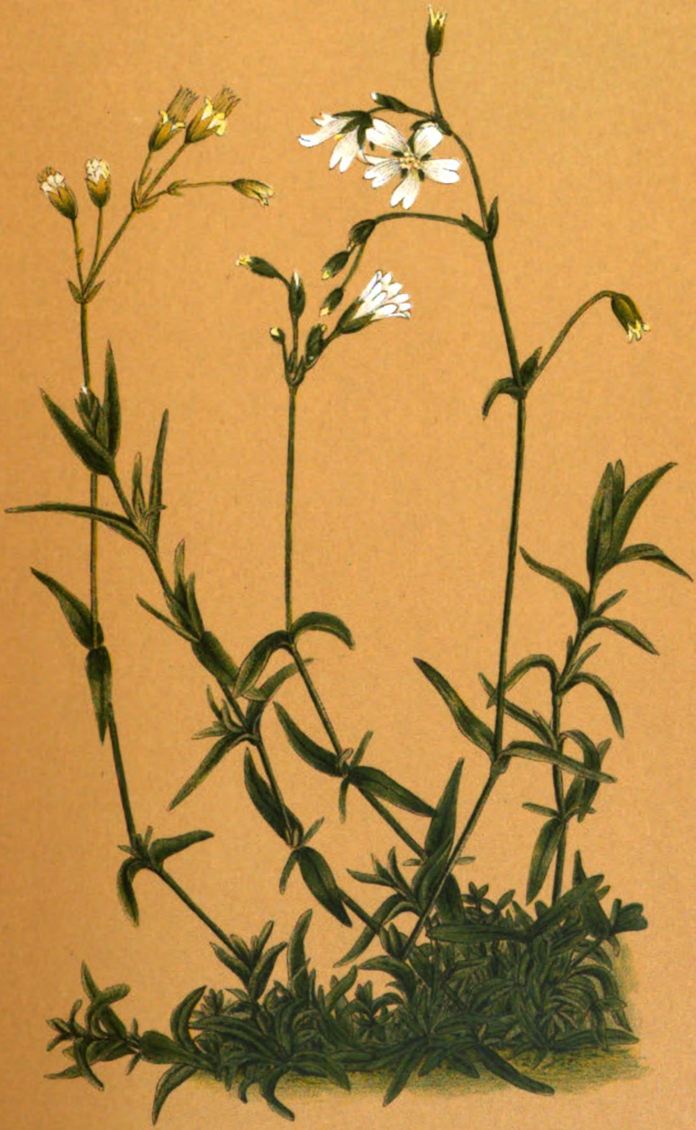
Plate LXIV., fig. 1.—*C. arvense*, L. Drawn from a specimen collected by Prof. T. C. Porter, on the shore of the Delaware River below Phillipsburg, N. J.

Fig. 2.—*C. arvense*, L., var. *maximum*. Drawn from a specimen collected by Mrs. M. K. Curran, near San Francisco, Cal.

Fig. 3.—*C. arvense*, L., var. *Fuegianum*. Drawn from specimen collected by Prof. J. M. Coulter, at the Lower Fire Hole Basin, Yellowstone National Park.

Fig. 4.—*C. arvense*, L., var. *Fuegianum*, Hook., f. from Orange Harbor, Fuegia.

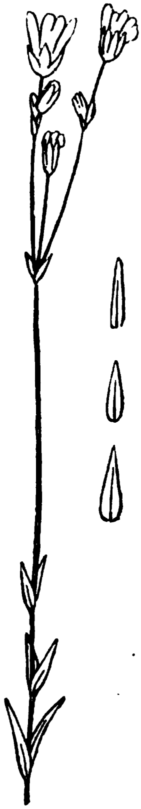
Plate LXV., Fig. 5.—*C. arvense*, L., var. *latifolium*, Fenzl. Drawn from specimen collected in the mountains of Colorado, 1872, by Dr. Torrey.



Arthur Hollick del. ad Nat. Julius Bien & Co. Lith.

CERASTIUM ARVENSE L., VAR., OBLONGIFOLIUM

Bulletin of the Torrey Botanical Club. Plate LXV.



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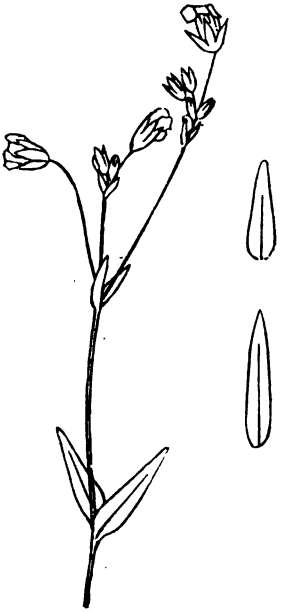

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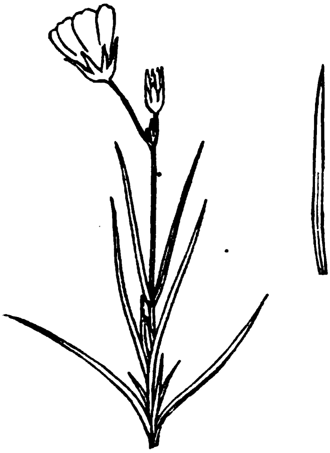

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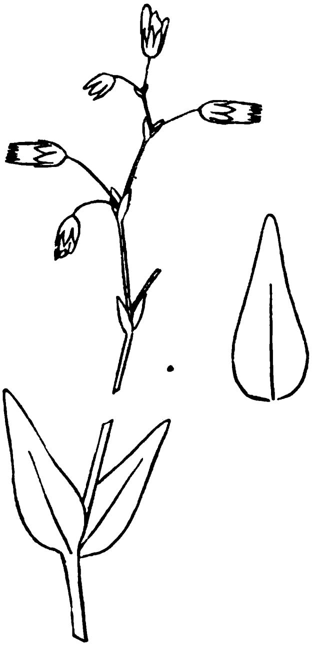

8

Varieties of Cerastium arvense, L.

Fig. 6.—*C. arvense,* L., var. *oblongifolium,* from Staten Island.

Fig. 7.—*C. arvense,* L., var. *angustifolium,* Fenzl. Drawn from specimen in Dr. Gray's herbarium, collected in Oregon by Geyer.

Fig. 8.—*C. arvense,* L., var. *villosum.* From specimen collected by Prof. T. C. Porter, in Lancaster county, Penn.

All the figures on Plates LXIV. and LXV. were drawn from herbarium specimens.

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 3.

Plant Notes from Termiscouata County, Canada.

BY J. I. NORTHROP

(Reprinted from the BULLETIN OF THE TORREY BOTANICAL CLUB, November, 1887.)

W. G. FARLOW.

Plant Notes from Termiscouata County, Canada.

BY J. I. NORTHROP.

The parish of Notre Dame du Lac lies on the western shore of Lake Termiscouata, Termiscouata Co., Canada, about forty-eight miles from Rivière du Loup and thirty-one miles from Edmundston, N. B.

The surrounding country is for the most part rolling hills covered with the usual second growth of spruce, fir, larch and birch. There are also groves of sugar maple and yellow birch, and on the lowland near the lake the balsam poplar, *Populus balsamifera*, grows luxuriantly. *Populus tremuloides*, *Acer rubrum*, *A. spicatum*, *Prunus Pennsylvanicum* and *Rhus typhina* are common trees of the region.

The lake is about thirty miles long, and varies from three-quarters of a mile to two miles in width. The shore is in most places of slate, forming rocky points running into the lake, sometimes so abruptly as to make passing exceedingly difficult. In the crevices of the slate grow *Lobelia Kalmii*, *Campanula rotundifolia* and *Parnassia Caroliniana*. Near the bank we find *Potentilla fruticosa*, *Spiræa salicifolia* and *Myrica gale*.

Farther up *Alnus viridis*, *Cornus stolonifera* and *Viburnum Opulus* form thickets guarded by the ever present Joe Pieweed, *Eupatorium purpureum*. Here and there along the bank the berries of *Pyrus sambucifolia* add their bright color to the scene.

Along the roadside, where not shaded by trees, *Artemisia vulgaris* grows in undisturbed luxuriance, in company with the wild raspberry, *Rubus strigosus*, and *Sambucus racemosa*.

In the fields one misses the ubiquitous *Chrysanthemum Leucanthemum*, but its place is well filled by *Anaphalis margaritacea* and the Canada thistle. In many places the banks of the roadside are covered with the bunch berry, *Cornus Canadensis*, which the French Canadians aptly called "La rouge." Driving back from the lake, five or six ranges of hills are crossed in as many miles. In the valleys are lakes bordered with cedar swamps of *Thuja occidentalis*. The lakes are shallow and have a muddy bottom. *Cassandra calyculata*, *Kalmia angustifolia*, *Ledum latifolium*, are common on the borders.

The road from Notre Dame du Lac to Rivière du Loup runs partly through scattered farms and partly through woodland. The land where cleared and neglected is covered with a dense growth of *Pteris aquilina* and *Epilobium spicatum.*

From Rivière du Loup I drove to Cacouna, a distance of four miles down the St. Lawrence. The beach at Cacouna is rocky in some places, and at others sandy. On the sand *Cakile Americana*, *Lathyrus maritimus*, *Mertensia maritima* and *Arenaria peploides*, were collected. On the rocky points *Plantago maritima* was found abundant.

The plants of the following list were mostly collected during the month of August, at Notre Dame du Lac. A few are from Grand Falls, N. B., where a stay of a few days was made.

Dr. N. L. Britton has kindly annotated the list, and many thanks are due him for his assistance and for suggestions in regard to nomenclature.

CATALOGUE.

RANUNCULACEÆ.

Thalictrum polygamum, Muhl. Notre Dame du Lac.
Anemone multifida, Poir. Grand Falls.
Anemone dichotoma, L. Notre Dame du Lac.
Anemone Virginiana, L. Same locality.
Ranunculus aquatilis, L., var. *trichophyllus*, Chaix. Same locality.
Ranunculus acris, L. Same locality.
Ranunculus Pennsylvanicus, L. Same locality.
Actæa spicata, L. var. *rubra*, Michx. Same locality.

SARRACENIACEÆ.

Sarracenia purpurea, L. Notre Dame du Lac.

CRUCIFERÆ.

Raphanus sativus, L. Cacouna.
Cakile Americana, Nutt. Same locality.

VIOLARIÆ.

Viola blanda, Willd. Notre Dame du Lac.

CARYOPHYLLEÆ.

Silene inflata, Smith. Notre Dame du Lac.
Cerastium viscosum, L. Same locality.
Stellaria media, (L.) Smith. Same locality.

Arenaria peploides, L. Cacouna.

Spergula arvensis, L. Notre Dame du Lac.

HYPERICINEÆ.

Hypericum mutilum, K. Notre Dame du Lac.

Hypericum Virginicum, L. (*Elodes Virginica*, Nutt). Same locality.

MALVACEÆ.

Malva moschata, L. Notre Dame du Lac.

GERANIACEÆ.

Oxalis Acetosella, L. Grand Falls.

Impatiens biflora, Walter, 1788 (*I. fulva*, Nutt., 1818). Notre Dame du Lac.

ILICINEÆ.

Nemopanthes Canadensis (Michx.) DC. Notre Dame du Lac.

SAPINDACEÆ.

Acer rubrum, L. Notre Dame du Lac.

Acer saccharinum, Wang. Same locality.

Acer spicatum, Lam. Same locality.

ANACARDIACEÆ.

Rhus typhina, L. Notre Dame du Lac.

LEGUMINOSÆ.

Trifolium agrarium, L. Notre Dame du Lac.

Trifolium pratense, L. Same locality. Also a white-flowered form.

Trifolium repens, L Same locality.

Astragalus alpinus, L. Grand Falls.

Vicia Cracca, L. Notre Dame du Lac.

Lathyrus maritimus, (L.) Bigelow. Cacouna.

ROSACEÆ.

Prunus Pennsylvanica, L. Notre Dame du Lac.

Spiræa salicifolia, L. Same locality.

Rubus strigosus, Michx. Grand Falls.

Rubus triflorus, Richards. Notre Dame du Lac.

Geum strictum, Ait. Same locality.

Fragaria vesca, L. Grand Falls.

Fragaria Virginiana, Duschene. Notre Dame du Lac.

Potentilla Anserina, L. Termiscouata Lake.

Potentilla fruticosa, L. Notre Dame du Lac.

Potentilla Norvegica, L. Same locality.
Potentilla palustris, (L.) Scop. Same locality.
Agrimonia Eupatoria, L. Same locality.
Poterium Canadense, L. Cacouna.
Rosa blanda, Ait. Notre Dame du Lac.
Pyrus sambucifolia, Cham. and Sch. Same locality.

SAXIFRAGEÆ.

Mitella nuda, L. Grand Falls.
Parnassia Caroliniana, Michx. Notre Dame du Lac.
Ribes lacustre, Poir. Grand Falls.

DROSERACEÆ.

Drosera rotundifolia, L. Notre Dame du Lac.

HALORAGEÆ.

Hippuris vulgaris, L. Dubé's Lake, Termiscouata.

ONAGRARIÆ.

Epilobium spicatum, Lam. Notre Dame du Lac.
Œnothera biennis, L. Cacouna.
Circæa alpina, L. Notre Dame du Lac.

UMBELLIFERÆ.

Sanicula Marylandica, L. Notre Dame du Lac.
Conioselinum bipinnatum, (Walter) Britton.* Same locality.

ARALIACEÆ.

Aralia hispida, Vent. Notre Dame du Lac.
Aralia nudicaulis, Grand Falls.
Aralia racemosa, L. Same locality.

CORNACEÆ.

Cornus Canadensis, L. Grand Falls.
Cornus stolonifera, Michx. Same locality.

CAPRIFOLIACEÆ

Sambucus racemosa, L. Notre Dame du Lac.
Viburnum lantanoides, Michx.† Same locality.
Viburnum Opulus, L Same locality.

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* CONIOSELINUM BIPINNATUM (Walter, Flor. Car., p. 115, under *Apium*, 1788; *Selinum Canadense*, Michx., 1803). I am following Coulter and Rose in keeping up the genus *Conioselinum*.—N. L. B.

† If the *V. alnifolia* of Marshall is this plant, the name has priority; it is referred to *V. lantanoides* by Dr. Gray, in Syn. Flor., while DeCandolle, Prodr., iv., p. 328, refers it to *V. molle*, Michx.—N. L. B.

Linnæa borealis, L. Same locality.

Diervilla trifida, Mœnch. Same locality; also at Grand Falls, the latter a form with leaf-margins abundantly ciliate.

RUBIACEÆ.

Galium trifidum, L., var. *pusillum*, Gray. Notre Dame du Lac.

Galium triflorum, Michx. Grand Falls.

COMPOSITÆ.

Eupatorium ageratoides, L. Notre Dame du Lac.

Eupatorium purpureum, L.

Solidago bicolor, L. var. *concolor*, Torr. and Gray. Same locality.

Solidago macrophylla, Pursh. Same locality.

Solidago neglecta, Torr. and Gray. Grand Falls.

Solidago serotina, Ait. Notre Dame du Lac.

Erigeron annuus, Pers. Same locality.

Erigeron Canadensis, L. Same locality.

Erigeron hyssopifolius, Michx. Grand Falls.

Erigeron strigosus, Muhl. Notre Dame du Lac.

Aster diffusus, Ait. Same locality.

Aster macrophyllus, L. Same locality.

Aster puniceus, L. Same locality.

Aster umbellatus, Mill. Same locality.

Anaphalis margaritacea, (L.) Benth. and Hook. Same locality.

Achillæa Millefolium, L. Same locality.

Chrysanthemum Leucanthemum, L. Same locality.

Artemisia caudata, L. Grand Falls.

Artemisia vulgaris, L. Notre Dame du Lac.

Senecio aureus, L., var. *Balsamitæ*, T. and G. Grand Falls.

Cnicus arvensis, (L.) Hoffm. Notre Dame du Lac.

Arctium Lappa, L. Same locality.

Hieracium Canadense, Michx. Same locality.

Hieracium scabrum, Michx. Same locality.

Prenanthes altissima, L. Same locality.

Prenanthes serpentaria, Pursh. Grand Falls.

Lactuca leucophæa, (Willd.) Gray. Notre Dame du Lac.

Sonchus arvensis, L. Cacouna.

CAMPANULACEÆ.

Lobelia Kalmii, L. Notre Dame du Lac.

Campanula rotundifolia, L. Grand Falls.

VACCINIACEÆ.

Vaccinium Canadense, Kalm. Notre Dame du Lac.
Vaccinium Pennsylvanicum, Lam. Same locality.

ERICACEÆ.

Cassandra calyculata, (L.) Don. Notre Dame du Lac.
Andromeda Polifolia, L. Same locality.
Kalmia angustifolia, L. Same locality.
Ledum latifolium, Ait. Same locality.
Chimaphila umbellata, (L.) Nutt.

MONOTROPEÆ.

Monotropa uniflora, L. Notre Dame du Lac.

OLEACEÆ.

Fraxinus viridis, Michx. A form with pubescent branchlets.

GENTIANEÆ.

Halenia deflexa, (Smith) Griseb. Notre Dame du Lac.

BORAGINEÆ.

Mertensia maritima, (L.) Gray. Cacouna.
Myosotis laxa, Lehm. Notre Dame du Lac.

SCROPHULARINEÆ.

Linaria vulgaris, Mill. Notre Dame du Lac.
Chelone glabra, L. Same locality.
Veronica Americana, Schwein. Same locality.
Castilleia pallida, Kunth. Grand Falls.
Euphrasia officinalis, L. Notre Dame du Lac.
Rhinanthus Crista-Galli, L. Same locality.

LENTIBULARIEÆ.

Utricularia vulgaris, L. Dubé's Lake, Termiscouata.
Utricularia intermedia, Hayne. Same locality.

LABIATÆ.

Mentha Canadensis, L., var. *glabrata*, Benth. Notre Dame.
Nepeta Cataria, L. Same locality.
Brunella vulgaris, L. Grand Falls, and Notre Dame du Lac.
Scutellaria galericulata, L. Notre Dame du Lac.
Scutellaria lateriflora, L. Same locality.
Stachys palustris, L. Same locality.
Galeopsis Tetrahit, L. Same locality.

PLANTAGINEÆ.

Plantago maritima, L. Cacouna.

CHENOPODIACEÆ.

Atriplex patula, L., var. *hastata*, Gray, Cacouna.

POLYGONACEÆ.

Polygonum aviculare, L. Notre Dame du Lac.
Polygonum Hydropiper, L. Same locality.
Polygonum lapathifolium, Ait., var. *incanum*, Koch. Same locality.
Rumex Acetosella, L. Grand Falls.
Rumex salicifolius, Weinm. Cacouna.
Rumex Brittanicus, L. Notre Dame du Lac.

EUPHORBIACEÆ.

Euphorbia Helioscopia, L. Notre Dame du Lac.

MYRICACEÆ.

Myrica Gale, L. Notre Dame du Lac.

CUPULIFERÆ.

Betula papyracea, Ait. Grand Falls.
Alnus viridis, DC. Notre Dame du Lac.
Corylus rostrata, Ait. Grand Falls.

SALICINEÆ.

Salix discolor, Muhl. Notre Dame du Lac.
Salix humilis, Marsh. Same locality.
Salix lucida, Muhl. Same locallty.
Populus balsamifera, L. Same locality.
Populus tremuloides, Michx. Grand Falls.

ORCHIDEÆ.

Spiranthes Romanzoffiana, Cham. Notre Dame du Lac.
Habenaria hyperborea, R. Br. Same locality.
Habenaria psycodes, (L.) Gray. Same locality.

IRIDEÆ.

Iris versicolor, L. Notre Dame du Lac.

LILIACEÆ.

Streptopus amplexicaulis, (L.) DC. Notre Dame du Lac.
Streptopus roseus, Michx. Same locality.

Smilacina trifolia, (L.) Desf. Same locality.
Maianthemum Canadense, Desf. Same locality.
Tofieldia glutinosa, Willd. A form with pedicels four to six lines long in fruit. Grand Falls.
Clintonia borealis, (Ker.) Raf. Notre Dame du Lac.

JUNCACEÆ.

Juncus effusus, L. Notre Dame du Lac.
Juncus filiformis, L. Same locality.
J. Canadensis, Gay, var. *coarctatus*, Engelm. Same locality.

TYPHACEÆ.

Sparganium simplex, Huds., var. *Nuttallii*, Engelm. (?) Same locality.

ALISMACEÆ.

Sagittaria variabilis, Engelm., var. *hastata*, Engelm. Notre Dame du Lac.

NAIADACEÆ.

Potamogeton natans, L. Same locality.
Potamogeton Pennsylvanicus, Cham. (*P. Claytonii*, Tuckerm.), fide Morong.

ERIOCAULEÆ.

Eriocaulon septangulare, With. Dubé's Lake, Termiscouata.

CYPERACEÆ.

Carex rostrata, With., var. *utriculata*, Bailey. Notre Dame du Lac.
Carex hystricina, Muhl. Same locality.
Carex flava, L. Same locality.
Carex scoparia, Schk. Same locality.

GRAMINEÆ.

Spartina cynosuroides, Willd. Notre Dame du Lac.
Deyeuxia Canadensis, (Beauv.) Hook. Same locality.
Glyceria Canadensis (Michx.) Trin. Same locality.
Elymus mollis, Trin. Cacouna.

CONIFERÆ.

Thuja occidentalis, L. Grand Falls.

EQUISETACEÆ.

Equisetum sylvaticum, L, Notre Dame du Lac.

FILICES.

Asplenium Filix-fœmina, (Swartz) Bernh. Notre Dame du Lac.
Phegopteris polypodioides, Feé. Same locality.
Phegopteris Dryopteris, (L.) Feé. Same locality.
Aspidium spinulosum, Swartz. Same locality.
Cystopteris bulbifera, (Swartz) Bernh. Grand Falls.
Aspidium marginale, Swartz. Same locality.
Osmunda Claytoniana, L. Notre Dame du Lac.

OPHIOGLOSSACEÆ.

Botrychium Virginianum, Swartz. Notre Dame du Lac.

LYCOPODIACEÆ.

Lycopodium clavatum, L. Notre Dame du Lac.
Lycopodium complanatum, L. Same locality.
Lycopodium dendroideum, Michx. Same locality.

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 4.

A List of Plants Collected by Miss Mary B. Croft, at San Diego, Texas.

BY N. L. BRITTON AND H. H. RUSBY.

(Reprinted from TRANSACTIONS OF THE NEW YORK ACADEMY OF SCIENCES, Vol. VII., 1887-1888.)

W. G. FARLOW.

The following paper was read by title:

A LIST OF PLANTS COLLECTED BY MISS MARY B. CROFT, 1884–'85, AT SAN DIEGO, TEXAS, NEAR THE HEADWATERS OF THE RIO DULCE, BY N. L. BRITTON AND H. H. RUSBY.

The species here enumerated were collected by Miss Croft during the years 1884–1886 and sent to Dr. Rusby for determination. His absence in South America has prevented their examination until the present time.

RANUNCULACEÆ.

19. *Anemone decapetala,* L., var. HETEROPHYLLA (Nutt.) (*A. heterophylla,* Nutt., mss.; Wood). We are unable to find any characters which would entitle this plant to specific rank. Indeed, our specimens show every gradation in leaf-form from the linear lobes of the typical *A. decapetala* to the nearly entire ones of the variety. A specimen collected by Merrill, in Robertson Co., Texas,[1] has both forms on the same plant. As here recognized, the variety extends east into Alabama (Buckley) and occurs also in South America, Cuming's specimens from Valparaiso in Herb. Torrey consisting of both type and variety.

BERBERIDACEÆ.

87. *Berberis trifoliata,* Moric.

PAPAVERACEÆ.

98. *Argemone Mexicana,* L.

CRUCIFERÆ.

88. *Vesicaria Fendleri,* Gray.
90. *Vesicaria lasiocarpa,* Hook.
93. *Draba platycarpa,* T. & G.
94. *Sisymbrium pinnatum* (Ell.), Greene. (*S. canescens,* Nutt.)
91. *Lepidium intermedium,* Gray.

VIOLACEÆ.

125. *Ionidium polygalæfolium,* Vent. (*I. lineare,* Torr.).

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[1] Mentioned in the Bull. Torr. Bot. Club, xiv., p. 68.

POLYGALEÆ.

29. *Polygala ovalifolia,* DC.
142. *Krameria lanceolata,* Torrey.

PORTULACEÆ.

28. *Portulaca parvula,* Gray, Proc. Amer. Acad., xxii., 274.
16. *Talinum lineare,* HBK. (*T. aurantiacum,* Engelm.).

MALVACEÆ.

14. *Callirhoë pedata,* Gray.
174. *Sida diffusa,* HBK.
131. *Sida physocalyx,* Gray.
33. *Abutilon holosericeum,* Scheele. A small form.
171. *Abutilon Texense,* T. & G.
105. *Sphæralcea hastulata,* Gray.
123. *Sphæralcea pedatifida,* Gray.
34. *Hibiscus cardiophyllus,* Gray.

LINEÆ.

97. *Linum Berlandieri,* Hook.
101. *Linum multicaule,* Hook.

MALPIGIACEÆ.

156. *Aspicarpa hyssopifolia,* Gray. A form with leaves broader than in the original, distinctly veined and lanceolate.

GERANIACEÆ.

117. *Geranium Carolinianum,* L.
95. *Erodium Texanum,* Gray.
10. *Oxalis corniculata,* L. A form with close-appressed, cinereous pubescence.
86. *Oxalis dichondræfolia,* Gray.
31. *Oxalis Drummondii,* Gray. Fide Trelease.

RUTACEÆ.

81. *Thamnosma Texanum* (Gray), Torr.

CELASTRINEÆ.

161. *Schæfferia cuneifolia,* Gray.

RHAMNACEÆ.

129. *Colubrina Texensis*, Gray.

AMPELIDEÆ.

69. *Vitis incisa*, Nutt. From a sketch by Miss Croft it would appear that this vine has a thick, moniliform root.

LEGUMINOSÆ.

15. *Lupinus subcarnosus*, Hook.
51. *Eysenhardtia amorphoides*, HBK.
138. *Dalea lasianthera*, Gray.
147. *Dalea nana*, Torr.
175. *Petalostemon gracilis*, Nutt.
84. *Astragalus Nuttallianus*, DC.
23. *Indigofera leptosepala*, Nutt.
83. *Vicia exigua*, Nutt.
22. *Galactia heterophylla*, Gray.
27. *Galactia marginalis*, Benth.
63. *Rhynchosia Texana*, T. & G.
103. *Sophora secundiflora* (Orteg.), Lag.
106. *Cassia pumilio*, Gray.
Proposis juliflora, DC.
162. *Desmanthus Jamesii*, T. & G. ?
154. *Schrankia angustata*, T. & G.
155. *Acacia filicina*, Willd.
157. *Acacia Greggii*, Gray.

ONAGRARIEÆ.

1. *Œnothera Hartwegii*, Benth.
108. *Œnothera rosea*, Ait., with remarkably lyrate root-leaves.
2. *Œnothera speciosa*, Nutt.
111. *Gaura Drummondii*, T. and G.
127. *Gaura sinuata*, Nutt.
109. *Gaura tripetala*, Cav.

PASSIFLOREÆ.

64. *Passiflora tenuiloba*, Engelm.

CUCURBITACEÆ.

68. *Sicydium Lindheimeri*, Gray. (*Maximowiczia Lindheimeri*, Cogn.)

CACTEÆ.

30. *Echinocactus setispinus,* Engelm.

UMBELLIFERÆ.

80. *Bowlesia lobata,* Ruiz & Pav.

82. *Apium echinatum* (Nutt.), Watson, Bibliog. Index, Part i., 412.

81. *Apium Popei* (T. & G.), Gray.

118. *Chærophyllum procumbens* (L.), Crantz, var. *Teinturiei* (Hook.), Coulter & Rose.

120. *Daucus pusillus,* Michx.

RUBIACEÆ.

85. HOUSTONIA CROFTIÆ, n. sp. Annual; depresssed-spreading from a slender, straight root; stems about 25^{mm} long, simple, or dichotomously branching, minutely scabrous; leaves 5 to 10^{mm} long, oblanceolate, tapering into a very short petiole, revolute, obtuse; petioles sparingly ciliate; flowers white, minute (about 3^{mm} long), sessile in the axils; fruit didymous, 2^{mm} high, short-stalked, clothed with short hairs; calyx teeth acute, about half the length of the corolla tube.

A diminutive species in the section of *H. humifusa,* Gray, Syn. Flor. Gamopet., p. 25.

26. *Houstonia angustifolia,* Michx. A branching form.

76. *Galium virgatum,* Nutt. A smoothish, thin-leaved form.

COMPOSITÆ.

53. *Eupatorium Greggii,* Gray.

36. *Eupatorium incarnatum,* Walt.

21. *Liatris punctata,* Hook. the var. γ of Torrey & Gray, having leaves ciliate with rigid hairs.

54. *Gymnosperma corymbosum,* DC.

55. GUTIERREZIA SAROTHRÆ (Pursh.). (*Solidago Sarothræ,* Pursh. Flor. Amer. Sept., ii., 540, 1814; *Brachyris Euthamiæ,* Nutt., Genera, ii., 163, 1818; *G. Euthamiæ,* T. & G.)

47. HETEROTHECA SUBAXILLARIS (Lam.). (*Inula subaxillaris,* Lam., Dict. iii., 259, 1789; *H. Lamarckii,* Cass. 1823.)

42. *Chrysopsis villosa* (Pursh.), Nutt., var. *canescens* (DC.), Gray.

37. *Haplopappus spinulosus* (Pursh), DC.

144. *Aphanostephus humilis* (Benth.), Gray.

41. *Aster multiflorus,* Ait.

136. *Erigeron tenuis,* T. & G.

49. *Achætogeron Palmeri,* Gray?
72. *Evax multicaulis,* DC.
77. *Melampodium cinereum,* DC. A form near var. *ramosissimum* (DC.), Gray.
126. *Engelmannia pinnatifida,* Torr. & Gray.
100. *Parthenium Hysterophorus,* L.
45. *Helianthus annuus,* L.
173. *Helianthus ciliaris,* DC. A form with narrow leaves nearly matching Dr. Palmer's specimens No. 616, from Juraz, Coahuila, 1880.
169. *Encelia subaristata,* Gray. Differing only in the pappus from *E. calva* (Engelm. & Gray), Gray.
38. *Verbesina encelioides* (Cav.), Gray, Syn. Flor. Gamopet., 288. A form with the involucral bracts equalling the rays.
40. *Verbesina Virginica,* L.
170. *Coreopsis cardaminefolia* (DC.), T. & G.
43. *Cardamine,* near the last, and perhaps the var. *lineariloba,*T. & G., but the rays are yellow to the base.
39. *Polypteris Texana* (DC.), Gray.
96. *Hymenatherum tenuilobum,* DC.
133. *Helenium amphibolum,* Gray.
102. HELENIUM SETIGERUM (DC.). (*Amblyolepis setigera,* DC., fide Benth. & Hook., Gen. Plant., ii., 414.)
128. *Gaillardia pulchella,* Foug.
131. GAILLARDIA SUAVIS (Gray & Engelm.). (*Agassizia suavis,* Gray & Engelm., Proc. Amer. Acad., i., 49, Dec. 1st, 1846; *G. simplex,* Scheele, Linnæa, xxii., 160, 1849.)
46. *Artemisia Mexicana,* Willd., var. *angustifolia,* Schultz, Bip.
35. *Chaptalia nutans* (L.), Hemsley.
141. *Perezia runcinata,* Lag.
48. *Pyrrhopappus multicaulis,* DC. ?
135. *Pinaropappus roseus,* Less.
44. *Lygodesmia aphylla* (Nutt.), DC., var. *Texana,* T. & G.

OLEACEÆ.

13. *Menodora heterophylla,* Moric.

ASCLEPIADEÆ.

70. PHILIBERTIA VIRIDIFLORA (Torrey). (*Gonolobus viridiflorus,* Torrey, Ann. Lyc. N. Y., ii., 219, 1828; *Sarcostemma cynanchoides,* Dec. in DC., Prodr., viii., 540, 1844; *P. cynanchoides,* Gray.)
62. *Metastelma barbigerum,* Scheele.

166. *Gonolobus parviflorus* (Torr.), Gray. On these specimens some of the lower leaves are cordate.

POLEMONIACEÆ.

4. *Gilia rigidula*, Benth.

BORAGINEÆ.

148. *Coldenia canescens*, DC.
134. *Echinospermum Redowskii* (Hornem.), Lehm., var. *strictum* (Nees), S. Wats. (var. *cupulatum*, Gray).
104. *Lithospermum canescens* (Michx.), Lehm.

CONVOLVULACEÆ.

66. *Ipomœa Nil* (L.), Pursh. (*I. hederacea*, Jacq.)
67. *Ipomœa trifida* (HBK.), Don, var. *Berlandieri*, Gray.
139. *Convolvulus hermannioides*, Gray.
143. *Evolvulus sericeus*, Swartz.
6. *Cuscuta indecora*, Choisy, var. *pulcherrima* (Scheele), Engelm.

SOLANACEÆ.

5. *Solanum eleagnifolium*, Cav.
11. *Physalis Fendleri*, Gray, var. *cordifolia*, Gray, Syn. Flor. Gamopet., 1st Ed., p. 395, ex. descr.; name not in 2d Ed.
75. *Chamæsaracha sordida* (Dunal), Gray.
179. *Capsicum baccatum*, L.
132. *Nicotiana repanda*, Willd.
32. BOUCHETIA ANOMALA (Miers). (*Nierembergia anomala*, Miers, Lond. Journ. Bot., v., 175, 1846; *Bouchetia erecta*, DC., Prodr., xiii., i., 588, 1852.)

SCROPHULARINEÆ.

50. *Leucophyllum Texanum*, Benth.
92. *Linaria Canadensis* (L.), Dumort. A form with larger flowers than ordinary.

OROBANCHACEÆ.

153. *Aphyllum multiflorum* (Nutt.), Gray.

ACANTHACEÆ.

151. *Calophanes linearis* (T. & G.), Gray.
150. *Ruellia tuberosa*, L.
165. *Siphonoglossa Pilosella* (Nees), Torr.

VERBENACEÆ.

52. *Lantana Camara,* L.
79. *Verbena canescens,* HBK.
78. *Verbena ciliata,* Benth.
119. *Verbena officinalis,* L.

LABIATÆ.

140. *Hedeoma Drummondii,* Benth.
172. *Salvia ballotæflora,* Benth.
137. *Salvia Texana,* Torr.
159. *Monarda clinopodioides,* Gray.
99. *Scutellaria Drummondii,* Benth.

PLANTAGINEÆ.

112. *Plantago Patagonica,* L., var. *gnaphalioides* (Nutt.) Gray.
110. *Plantago Virginica,* L.

NYCTAGINEÆ.

158. *Nyctaginea capitata,* Choisy.
176. *Allionia incarnata,* L.
145. *Acleisanthes longiflora,* Gray.

PHYTOLACCACEÆ.

9. *Rivina lævis,* L.

POLYGONACEÆ.

115. *Rumex Berlandieri,* Meisn.

ARISTOLOCHIACEÆ.

124. *Aristolochia longiflora,* Engelm. & Gray.

EUPHORBIACEÆ.

168. *Euphorbia melanodenia,* Torr.
74. *Euphorbia Peplidion,* Engelm. (Determined by Dr. Sereno Watson).
3. *Phyllanthus polygonoides,* Nutt.
25. *Croton capitatus,* Michx. (?)
164. *Acalypha hederacea,* Torrey.

167. *Tragia ramosa,* Torrey, 1828. (*T. stylaris,* Muell. Arg., 1865.)

24. STILLINGIA DENTATA (Torr.), (*Sapium* (?) *annuum,* Torr., var. *dentatum,* Torr., Bot. Mex. Bound. Surv., p. 201, 1859; *Stillingia Torreyana,* S. Wats., Proc. Amer. Acad., xiv., p. 298, 1879.)

URTICACEÆ.

122. *Urtica chamædryoides,* Pursh.
73. *Parietaria debilis,* Forst.

AMARYLLIDEÆ.

18. *Cooperia Drummondi,* Herb.
17. *Zephyranthes Andersonii* (Herb.), Benth. & Hook., Gen. Plant., iii., 724 (*Habranthus Andersonii,* Herb.).

LILIACEÆ.

107. *Allium mutabile,* Michx.
71. *Nothoscordum striatum* (Jacq.), Kunth.

COMMELINACEÆ.

8. *Commelina nudiflora,* L.
7. *Commelina Virginica,* L.

CYPERACEÆ.

180. *Cyperus aristatus,* Rottb.

GRAMINEÆ.

(Determined by Dr. George Vasey.)

57. *Panicum leucophæum,* HBK., var. *leucanthum,* Vasey.
178. *Setaria setosa,* Beauv., var. *caudata,* Griseb.
116. *Thurberia Arkansana* (Nutt.), Vasey.
56. *Andropogon saccharoides,* Swartz.
72. *Stipa setigera,* Presl.
60. *Chloris cucullata,* Bisch.
61. *Trichloris pluriflora,* Fourn.
58. *Bouteloua hirsuta,* Lag., var. *minor,* Vasey.
59. *Bouteloua racemosa,* Lag.

MARSILEACEÆ

121. *Marsilea macropoda,* Engelm.

3,

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um,
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Acad.,

n.

CONTRIBUTIONS FROM THE HERBARIUM OF COLUMBIA COLLEGE.—No. 5.

New or Noteworthy North American Phanerogams

BY N. L. BRITTON.

(Reprinted from the BULLETIN OF THE TORREY BOTANICAL CLUB, April, 1888.)

W. G. FARLOW.

New or Noteworthy North American Phanerogams.—I.

BY N. L. BRITTON.

Plate LXXX.

Aquilegia Canadensis, L., var. FLAVIFLORA, n. var. (*A. flaviflora*, Tenney, Amer. Nat., i., 389). On the 15th of May, 1866, Prof. Sanborn Tenney, of Vassar College, found a yellow-flowered Columbine on the high ground west of the Hudson, and opposite the city of Poughkeepsie, which he described in the first volume of the American Naturalist as *Aquilegia flaviflora*. On May 17th of the succeeding year he collected the same variety near the same place, and proposed to try to raise the plant from the seed. Of his farther observations I find no record.

On May 24, 1885, during a Club Field Excursion at Seabright, Monmouth County, New Jersey, the plant was found in considerable abundance on the south bank of the Navesink River, along the top of a bluff some twenty feet above the water level. It grew there with the ordinary red-flowered, typical form, with which its showy flowers formed a marked and beautiful contrast, both being remarkably luxuriant. Associated with them was *Cerastium arvense*, L., and near by grew *Smilacina stellata*, Desf., neither of which had been noted so far south along the coast. I removed a plant of the yellow *Aquilegia* to a garden where it has since bloomed every year, maintaining its character. I have not been able to detect any other differences between it and the type except that the whole plant is of a light yellowish green instead of the usual reddish purple hue of the young plants of the ordinary form.

CERASTIUM TEXANUM, n. sp. Stem slender, 15-20 cm. high, pilose, especially towards the base, branching dichotomously above; leaves two to four pairs on the lower part of the stem, spatulate with an acute apex, sparingly pilose on both surfaces, 8-15 mm. long, 3-4 mm. wide; flowers few, small, terminating the branches; calyx lobes ovate, acute, 4-5 mm. long, nerved, minutely hairy; petals apparently linear, slightly longer; capsule about 7 mm. long, its ten teeth revolute; seeds numerous, angular, roughened with minute points.

Habitat: "Hills, Blanco, March, April," C. Wright, Mexican Boundary Survey Collections, No. 69.

This very distinct species is represented in the Torrey Herbarium by half a dozen fragments, and does not appear to have been distributed. It adds another member to the section *Streptocarpi*, and seems nearest to *C. pilosum.*

Astilbe decandra, D. Don, var. CRENATILOBA, n. var. Leaflets obtuse, crenate, mucronate, the upper one somewhat three-lobed; follicles about 2 mm. long, ovate; calyx lobes obtuse. Collected on the slope of Roan Mt., East Tennessee, along the trail from "Cloudland" to the Roan Mt. station of the E. T. & W. N. C. R. R.

The plant differs markedly from the typical *Astilbe decandra* in its shorter and stouter pods and blunt crenate leaves. It may be more than a mere variety, but I do not feel warranted in describing it as a species. The fact of collection is noted in this BULLETIN, Vol. xiii, p. 74.

Juncus filipendulus, Buckley, Proc. Acad. Nat. Sci. Phila., 1862, p. 8. (*J. Buckleyi*, Engelm., Trans. Acad. Sci. St. Louis, iii., p. 435; *J. leptocaulis*, Torr., apud Engelm., l. c., p. 454.)

Mr. Buckley's name has distinct priority over Dr. Engelmann's and should be restored. The plant was collected in 1887 by Mr. Nealley.

CYPERUS MARTINDALEI, n. sp. Culms erect, very slender, smooth, 50 to 60 cm. high; leaves very narrowly linear, nearly smooth with a prominent midrib, about half the length of the culm; involucre of about 3 leaves, 4 to 10 cm. long, the longest overtopping the inflorescence; umbel of a sessile head of numerous spikes and 1 to 3 smaller heads on slender peduncles; spikes linear, about seven-flowered; scales ovate, obtusish, about nine-nerved; achenium linear-oblong, triangular, about 1 mm. long, acute. Bases of the culms hard and corm-like, as in *C. strigosus*, L.; rootstocks very slender, with delicate scales.

Florida, from the herbarium of Dr. Ferdinand Rugel, now incorporated with that of I. C. Martindale, an enthusiastic collector and patron of botany, for whom the species is named. Collected also by Chapman at Appalachicola, and marked in his herbarium at Columbia College, as *C. ovularis*, Torr., with which it has but little affinity. In habit it resembles *C. filiculmis*, Vahl.

CYPERUS ECHINATUS (Ell.) (*Mariscus echinatus*, Ell., Sk., i, 75, 1821; *Cyperus Baldwinii*, Torr., Ann. Lyc., iii., 270, 1836.) This species, not hitherto reported from beyond the limits of the United States, though from its collection by the botanists of the Mexican Boundary Survey, and by Buckley in the Valley of the Rio Grande, we may suspect its occurrence in northern Mexico, comes now from Jamaïca (J. Hart, No. 1034.)

Var. MULTIFLORA (Chapm.), n. var. Spikelets ten to even twenty five-flowered, the latter elongated to 20-25 mm. (*C. Baldwinii*, var. *multiflora*, Chapm., in Torr. Herb.)

Cyperus ferax, Richard. Not reported from Mexico nor Central America, in Hemsley's Botany of the Biologia Centrali-Americanæ is 1980, 1979 Müller from Orizava, 438 Bernouilli from Mazatenango, Guatemala, and also from Chihuahua (E. Wilkenson, in Herb., J. Donnell Smith.)

Cyperus ochraceus, Vahl, is also omitted from the Botany of the Biologia. It appears to be quite widely distributed, however, having been collected by Botteri, as already noted by me, and is represented in Müller's collections from Orizava by Nos. 1981 and 1982, and was collected by Türckheim at Coban, Guatemala, in 1887, and distributed by Capt. J. Donnell Smith as No. 1262.

Cyperus humilis, Kunth, var. ELATIOR, n. var. Culms erect, 12 to 15 cm. high; cauline leaves about equalling the culm; those of the involucre about 3, the longest 15 cm. in length. Otherwise nearly as in the type, which we have in C. Wright, Plantæ Cubanæ, No. 700.

Collected by H. von Türckheim, on the river-bank, near Coban, Guatemala (Distr. J. Donnell Smith, No. 705).

WEBSTERIA SUBMERSA (Sauvalle.) (*Scirpus submersus*, Sauv., Flor. Cubana, p. 176 (1868); *W. limnophila*, S. Hart Wright, BULL. TORR. CLUB, xiv, p. 135 (1887).

When examining the specimens of this plant kindly sent me by Mr. Wright, in June, 1887, I was much occupied with other matters and failed to recognize them as the same as Charles Wright's No. 3775, which had already received a name as cited above. I do not question the validity of the genus established by him, but would suggest its nearer affinity to *Heleocharis*, as indicated by Sauvalle, than to *Dulichium*, as supposed by Mr. Wright.

Heleocharis Engelmanni, Steud., Syn. 79. This species was described from specimens collected by Dr. Engelmann, at St. Louis, Mo., and labelled by him: "*E. obtusa*, Schult? var. *setis brevioribus*." It has an elongated, sub-cylindrical, often acutish spike and bristles only about the length of the achenium, or even shorter. In looking over a quite extensive suite of specimens of *Heleocharis ovata* (Roth), R. Br. (*H. obtusa*, Schultes), I find considerable variation in the relative lengths of bristles and achenium, while many which would fall under *H. ovata* through this character have heads elongated. The specimens most nearly according with Steudel's description of *H. Engelmanni* are from St. Louis (Engelmann, Riehl), Oquawka, Illinois (Patterson), (the var. *detonsa*, Gray), Tinicum, Delaware Co., Penn. (Porter) and "hills in Waltham, Mass.," (B. D. Greene) the last being the *H. obtusa*, var. *β*, Torrey, Ann. Lyc., iii., 303. The material at command indicates that Steudel's species is a variety of the wide-spread *H. ovata*, as remarked by Dr. Watson, in Bot. Cal., ii, p. 222, but more material is needed to settle this beyond dispute. The *Eleocharis diandra*, C. Wright, in BULL. TORR. CLUB, x., p. 101, seems clearly to belong here, and was so placed by Dr. Gray in Bot. Gaz., iii., p. 81, before Mr. Wright's description was published.

DICHROMENA CEPHALOTES (Walt.) (*Scirpus cephalotes*, Walt., Flor. Car., p. 71 (1788); *D. leucocephala*, Michx., Flor. Bor. Am., i, p. 37 (1803).)

Dichromena pubera, Vahl. Specimens collected by Dr. Watson in Guatemala (No. 166 a) are markedly proliferous, after the manner of some other sedges, the peduncles rooting at their apices.

DICHROMENA WATSONI, n. sp. Culm stout, sulcate, nearly smooth, 40 to 50 cm. high; leaves of the stem about 5, 15 to 20 cm. long, 5 to 7 mm. wide at the base, tapering to an acute apex, about seven-nerved, the nerves impressed on the upper surface and prominent on the lower; leaves of the involucre about nine, resembling those of the stem; spikes about nine, acute, 12 to 15 mm. long, sessile, forming a capitate cluster at the summit of the culm; scales ovate-lanceolate, acute and mucronate with the excurrent tip of the mid-nerve; achenium obovate, much shorter than the scale, transversely rugose, tipped with a broad, depressed tubercle; style very slender, two-cleft.

A remarkably large species, the cauline leaves arising from loose sheaths, and those of the involucre differing from other species of the genus in being green to their bases.

Collected by Dr. Sereno Watson in Guatemala, February to April, 1885 (No. 153.)

Dichromena nivea, Bœckl., under *Rhynchospora nivea*, Bœckl., Linnæa, xxxvii., p. 528 (1871.) (*D. diphylla*, Torr., Herb. and l. c.; *D. Reverchoni*, S. Hart Wright, BULL. TORR. CLUB, ix., p. 86 (1882.)

Although this plant was collected by Lindheimer in Texas, as long ago as 1847, and known to Dr. Torrey about that time, I cannot find any publication of his name until Bœckeler's paper above cited. It does not appear in the published lists of Lindheimer's collections. Bœckler, referring it to the genus *Rhynchospora*, gave it another name, citing Torrey's as a synonym. It appears to me that this is ample publication and that the later name of Mr. Wright cannot stand. As regards the names of Bœckeler and Torrey, both are cited as manuscript synonyms by the former, with *D. nivea* one line before *D. diphylla*—a nice point in nomenclature but sufficient for priority. The species is represented by Lindheimer's No. 718, Berlandier's 2089, Reverchon's 1233, and by a specimen collected by Wright, all from Texas. Also from Arkansas (Beyrich, Leavenworth.)

PSILOCARYA NITENS (Vahl.) (*Scirpus nitens*, Vahl, Enum. Pl., ii., 272 (1806); *P. rhynchosporoides*, Torr., Ann. Lyc. N. Y., iii., p. 361 (1836); *Rhynchospora nitens*, Gray.)

The relationship of this species to the *P. scirpoides*, Torr., cannot yet be regarded as established. True *P. nitens* has a transversely rugose achenium and a short tubercle; true *P. scirpoides* a smooth or but slightly rugose achenium and a long tubercle. A specimen in Herb. Torrey, collected by Leavenworth in East Florida and written up by Dr. Torrey as *P. intermedia*, has a strongly rugose achenium and a tubercle intermediate in length, indicating that they may all be but forms of one species, to which Vahl's specific name must be applied. *P. Texensis*, Torr. & Hook., seems not much more distinct than the others. The fourth member of the genus (*P. corymbiformis* (Wright), Benth. & Hook., Gen. Pl., iii., 1048; *Scirpus corymbiformis*, Wright, in Sauvalle Flor. Cubana, 176), has much more claim to specific rank.

Fimbristylis capillaris (L.), Gray, must include a large number of forms differing slightly in the amount of bearding at the mouths of the sheaths, the acute or obtuse apices of the scales and the size, markings and color of the nut. Besides the synonomy cited in Hemsley's Biologia, we must add *Isolepis ciliatifolia*, Torr., which appears hardly separable even as a variety, while the following may perhaps stand as varieties or marked forms:

Var. PILOSA, n. var. Culms densely pilose throughout; scales dark brown, acute. (Guatemala, Santa Rosa, Türckheim, 1887, No. 1283; Orizava, Müller, 1853, No. 1966.)

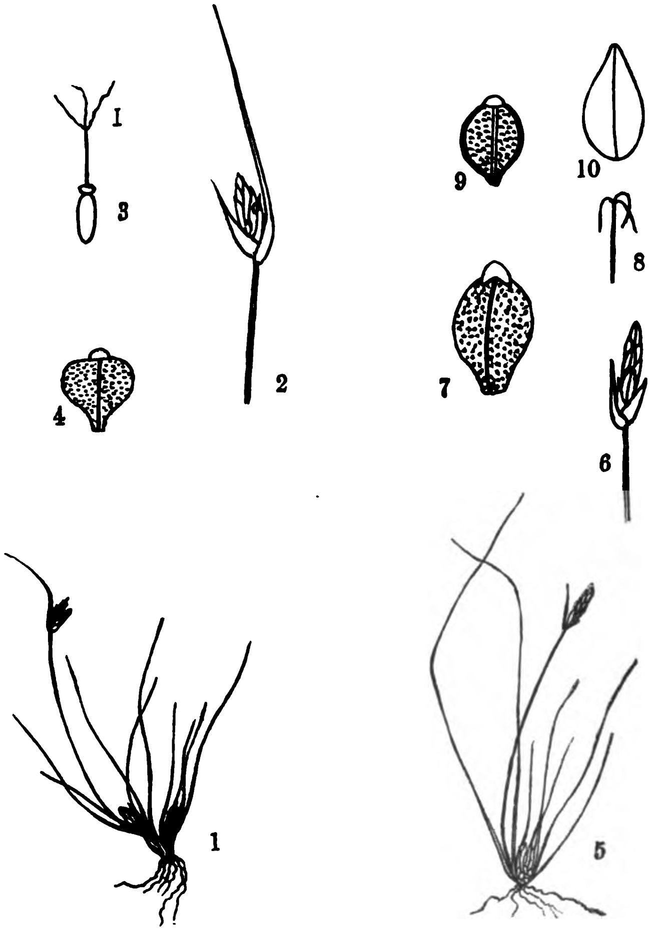
Var. COARCTATA (Ell.) (*Isolepis coarctata*, Torr.) Umbels contracted; spikes linear-oblong.

Fimbristylis Vahlii, Link., Hort. Berol., i, 287, is the older name for *F. congesta*, Torr., Ann. Lyc., iii., p. 345, as noted by Bœckeler, Linnæa, xxxvii., p. 9.

Fimbristylis monostachya (Vahl), Hassk., Pl. Jav. Rar., p. 61 (1848), is the name for *Abilgaardia monostachya*, Vahl, following Bentham and Hooker in reducing the genus to *Fimbristylis*.

Fimbristylis schœnoides, Vahl., has been collected by A. H. Curtiss, in Walton Co., Florida, as I have recently been informed by Dr. Watson. I do not find any record of its occurrence otherwise nearer than southern Asia, but there is a marked tropical distribution of Cyperaceæ of which this is perhaps only another example.

Bulletin of the Torrey Botanical Club. Plate LXXX.



Scirpus Pringlei, Britton. | Scirpus heterocarpus, Watson.

SCIRPUS PRINGLEI, n. sp. Annual, cæspitose, 1 to 2 inches high. Leaves capillary, all radical, about equalling the culm; spikes terminal and also radical, the latter surrounded and much overtopped by the leaves; terminal spikes oval, many-flowered, the lowest bract resembling the leaves, and an inch or so in length, the next 3-6 mm., the others lanceolate, very acute, about 2 mm. long, midribs slightly darker than the margins, every bract fertile; achenia sharply trigonal, broadly obovoid, the angles slightly ridged, the summit truncate, style three-cleft, its base persistent, stamens two. Basal spikes fewer flowered, otherwise nearly as the upper ones. Whole plant yellowish green.

Chihuahua, near Guerrero, C. G. Pringle, 1887, Nos. 1400 and 1399, the latter specimens without terminal spikes.

An interesting little species related to *S. heterocarpus*, S. Wats., which was also collected by Mr. Pringle at the same place (No. 1398), and in aspect resembling *Fimbristylis apus* (Gray), Wats. *S. heterocarpus*, is, however, coarser, its terminal spikes longer and narrower and dark brown; the achenia of its basal spikes twice as large as those of the upper. The two species form a marked group of the genus. *S. heterocarpus* is also now to be admitted into the United States lists, having been collected by Mr. Pringle, Aug. 29, 1884, on sandy plains south of Tucson, Arizona, near the Mexican boundary. Its range is also to be extended to the Bolivian Andes, Mandon's No. 1410 being referable to the species, differing only in the slightly coarser surface markings of the achenium.

EXPLANATION OF PLATE LXXX.

Fig. 1. *Scirpus Pringlei*, Britton, plant natural size; Fig. 2. Upper spikelet, X 2; Fig. 3. Pistil, X 8; Fig. 4. Achenium, X 8.

Fig. 5. *Scirpus heterocarpus*, Watson, plant natural size. Fig. 6. Upper spikelet, X 2. Fig. 7. Achenium, lower spikelet, X 8, swollen in water; when dry it is slightly shorter and broader. Fig. 8. Style and stigma, upper spikelet, X 8. Fig. 9. Achenium, upper spikelet, X 8. Fig. 10. Scale, upper spikelet, X 8.

Scirpus mucronatus, L. This old world species was collected over twenty years ago in Delaware County, Penn., by Mr. C. E. Smith and Dr. Geo. Smith, and appears to have since lain unnoticed in our herbaria, which is to a certain degree my own fault, for there is a specimen in the Torrey Herbarium dating back to 1864. Mr. Smith has sent me the following note on the locality: "It is in a small patch of *Sphagnum* in a field, 300 feet above tide-water." Mr. Martindale has it from the ballast grounds at Camden, but there seems no doubt that the Delaware County plant is a native. It is not quite as stout as the plants from Asia and Mauritius, but agrees very well with French specimens in Herb. Torrey.

Scirpus stenophyllus, Ell. (*Isolepis stenophylla*, Torr.), appears to be a true *Scirpus*, and is nearly related to *S. barbatus*, Rottb., to which it has been referred by Bœckeler, Linnæa, xxxvi., p. 792, as var. *Americanus*. It seems to me specifically distinct, but if reducible to a variety of Rottboll's species, a result by no means impossible when more material is obtained, it must bear Elliott's name.

HEMICARPHA MICRANTHA (Vahl.) (*Scirpus micranthus*, Vahl, Enum. Pl., ii., 254 (1806); *H. subsquarrosa*, Nees, in Mart. Flor. Bras., ii., Pars. i., p. 61 (1842.)

RHYNCHOSPORA AXILLARIS (Lam.) (*Schœnus axillaris*, Lam., Encyc., i., 137 (1791); *R. cephalantha*, Gray, Ann. Lyc., N. Y., iii., 218 (1836.)

In taking up the name I am guided by Bœckeler in Linnæa, xxxvii., p. 572, who states that he saw a specimen named by Lamarck in Willdenow's Herbarium.

SCLERIA GRAMINIFOLIA, n. sp. Culms 35 to 40 cm. high, slender, erect, triangular in section; leaves 3 or 4, 12-15 cm. long, all cauline, narrowly linear, attenuate to an acute apex, the upper reaching to the inflorescence but not overtopping it; panicle terminal, loose and quite simple, 4 to 5 cm. long, subtended by a linear bract, 2 to 6 cm. long; heads androgynous, sessile, or on peduncles 1 to 2 cm. long, of from 2 to 5 flowers, the fertile and sterile about equal in number. Achenium globular, 2 mm. in diameter, obtuse, minute apiculate, roughened, with short projecting processes, supported on a triangular perigynium, whose angles are prolonged upwards as ridges nearly to the apex of the achenium. Rootstocks fibrous.

Collected by C. G. Pringle in wet places, pine barrens, base of the Sierra Madre, Chihuahua, Sept. 28, 1887 (No. 1401.)

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 6.

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-'86.

I.

GENERAL FEATURES OF THE REGION TRAVERSED.

ENUMERTION OF THE THALLOPHYTA.

(Reprinted from the BULLETIN OF THE TORREY BOTANICAL CLUB. Vol XV., No. 7.)

(Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, July, 1888.)

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America. 1885-1886.—I.

GENERAL FEATURES OF THE REGION TRAVERSED.

The collections recorded in this series of papers were made during a two years journey along the Pacific coast and across the continent of South America, the special object being the investigation of Medical Botany.

The route of travel covered regions the most diverse as regards all the conditions of plant life. North of Guayaquil the coast is verdant, the luxuriant tropical vegetation reaching the very water's edge. But a short distance south of that city begins an entirely different region. The eastern cordillera of the Andes divides South America into two portions, having almost nothing in common. While only a few miles in width, this cordillera marks differences in soil, climate, and general appearance, as great as any to be observed upon the globe.

Upon the Pacific side there is a very general dearth of moisture, rain being in many places almost unknown, while upon the eastern slope rain is so constant that months may pass when the sun is seen for scarcely an entire hour, and the humidity is so great that clouds of rising vapor sometimes obscure the view of even the nearest objects. The laden clouds that sweep in from the tropical Atlantic lose little of their moisture in crossing the Amazonian basin; any loss is but temporary, the equilibrium being at once restored by the soaking up of a fresh supply from the enormous water surface that the region presents. But immediately on reaching the mountains, great volumes of water are precipitated. The lightened clouds endeavor to escape upward, reach the colder strata, and suffer fresh precipitations. This process is continued over a belt of two hundred and fifty miles of steadily increasing elevation, until the winds which cross the cordillera carry only the merest traces of moisture. Throughout most of this heavily watered region, the vegetation is of the densest character. Allowing for the breaks caused by the streams, it might be said that an arboreal animal, ascending a tree upon the Andean foothills, could pass to the Atlantic without once descending to the ground.

The species and genera of this eastern Andean region have in general a very wide range. With the latitude, varies the altitude at which they grow. As we pass to the cooler southern region, a species or its representative creeps down upon the mountain sides. Thus, the *Desfontainea spinosa*, Remy., which I collected abundantly in northern Bolivia, gradually descends, until in the neighborhood of the cape, Lieutenant Safford finds it near the sea level, constituting a characteristic feature of the landscape. Sometimes also, a species has its limits as to altitude very narrowly and sharply defined, but will be represented at successively lower elevations by other species exceedingly closely related. Of this, the *Cinchonas* furnish us a striking example. Each altitude has its own species—if species they can be called—and they usually overlap to but a trifling extent. I have (in two cases) looked along a mountain side where miles of *Cinchona Calisaya* had been planted, and seen the upward limit defined to within fifty feet by a line of dead or dying trees.

In general, we are disappointed by the scarcity of flowers as compared with the abundance of plants. To this rule, trees and many herbs are exceptions. But in the case of shrubs and vines, of which latter there is everywhere a multitude, it is strikingly true. It is probably to be accounted for by the steepness of the land and a climate highly favorable for the reëstablishment of detached fragments, torn away and carried to a new position. Unable to obtain the light and air necessary for a high floral development, they have learned to depend upon a less complicated method.

Turning to the western side, we find, as stated, a region in which almost every condition is reversed. With more or less scanty rains, strictly limited to a few months or even weeks, we get a treeless and almost shrubless region, with a temperature subject to very sudden and great variations. The amount of moisture increases with the altitude. Upon our school-maps great deserts are located on the table lands of this region. The real deserts, however, are not there, but along the coast. Upon the highlands there is sufficient moisture to redeem the country from barrenness, and it is a fairly good stock country. As upon the eastern side, so upon the western, the highland vegetation creeps down the mountains as we go southward, until at Valparaiso it reaches the ocean. North of Valparaiso there is thus left a true desert along the coast, which widens as we go northward, until at the boundary of Chili and Peru, we find miles of pure, absolutely barren sand. To the patient and industrious botanist this coast desert will furnish a far more interesting field than the luxuriant regions to the eastward. There is no regular water supply, the showers being infrequent and spasmodic, with years sometimes elapsing between them. But when they do occur in sufficient quantity we find a rich and beautiful flora, springing up, maturing and perishing in an incredibly short period of time. What special provisions are required, and what lessons in physiology are to be learned, while watching the processes of birth and extinction which are here going on! Long after the flora of the Amazonian basin shall have been satisfactorily classified, this desert region will be contributing its annual quota of undescribed species.

With this very meagre general outline before us, we shall notice briefly the special localities where the collections were made.

A part of a day each were spent at Guayaquil, Zorritos, Payta and Coquimbo, and two or three days at Lima, but only fragments were collected. Zorritos stands at the northern extremity of the desert, and is watered with moderate frequency. The *Prosopis*, *Cereus*, Amarantaceæ and Chenopodiaceæ, reminded me strongly of the gravelly hills of the Mohave desert. Payta is one of the dryest spots in the world, and Coquimbo is but little better. Lima, like Tacna, stands near the foot of the mountain. At the latter place a week was spent in the early part of February. No rain had occurred, and the fifty species collected were all from irrigated grounds. Tacna has one small stream, conducted through the town by a paved channel, and it does duty in great part as a sewer, besides furnishing the only water supply. From Tacna, the route lay seven days by mule, to La Paz. At nine thousand feet, 17° south latitude,* the vegetation is sufficient to afford pasturage for the llama. At twelve thousand feet we are upon the table-land, which is, in part at least, volcanic, and at first thickly covered with loose rounded stones. Farther on it becomes sandy and rocky by turns. We cross many superimposed small ranges, and skirt the bases of much greater ones. The landscape is much like that of our own south-western plateau, except that there is less grass. What frequently appears like a grassy plain, proves to be covered with plants like dwarf *Hypochœris* or *Perezia,* only an inch or two in height, and presenting a green cushion of needles in the form of spines terminating the erect linear leaves. Numerous species of *Adesmia,* rarely rising above a foot from the ground, and often very closely prostrate, cover much of the country.

Near the eastern verge of this table-land, in a basin two thousand feet deep, with nearly vertical walls of clay or gravel, is situated La Paz, at an elevation of about eleven thousand feet. Here I spent some two weeks during the months of February, March and April, collecting one hundred and fifty or more species. This was during the latter half of the rainy season, when the walls of the basin, and the gravelly and rocky hills along the La Paz River to the south, were richly clothed with plants in flower. The remainder of the time during this period was passed across the range in Yungas. Returning early in April to the coast, I proceeded to Valparaiso, where three months were spent. Here the season is earlier, and winter was just setting in when I arrived. A winter there is about the same as in northern Florida, the orange surviving, but not thriving. Some twenty-five or thirty stray specimens were found in flower before I returned to La Paz. It being then early in June, I found a dry and wintry season prevailing, with a most dreary prospect for a collector. For a long time business detained me in the city, save for a few short excursions across the mountains, and one long stay in the province of Yungas, made, unfortunately, at an unfavorable season for collecting. Just as the rains were beginning the next January, I was obliged to leave La Paz on my journey to the Atlantic. Thus, out of almost a year spent in this interesting region, fortune had favored me with only about two weeks favorable collecting. But extensive collections had been made meantime upon the eastern slope at Unduavi and Yungas. Unduavi is one of several little hamlets upon a mountain stream in the first valley to the eastward of La Paz. But I have characterized by this name the entire collecting station constituted by this valley and its enclosing mountains. At 12,000 feet begins the semi-alpine flora generally associated with *Aspidium aculeatum* and the smaller species of *Acrostichum*. At 10,000 feet the shining, coriaceous leaves of the tropics begin to be seen, and at 8,000 feet the vegetation is truly tropical, including bamboos, fuchsias and begonias. The whole surface is characteristically rocky, the soil being very scanty indeed. but rich. At Unduavi, between 8,000 and 10,000 feet, I collected 150 species in flower in October, in three days.

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*Distances, latitudes and altitudes are given approximately.

Crossing the northern wall of this valley, we find upon the summit, at about 11,000 or 12,000 feet, a cold, boggy and cloudy region, where sphagnums and long drooping lichens abound. Upon the other side we are in Yungas, referring not to the political boundary, but to my collecting station of that name. Descending to 7,000 feet, we enter the great Andean forests which become heavier and heavier, though scarcely denser, as we descend. The trunks and greater branches are scarcely to be seen for the epiphytes upon them, chief of which are orchids, bromeliads, ferns, mosses and aroids. At 5,500 feet we strike the coca and cinchona belt, and at 4,000 feet we find the heat becoming oppressive and the air sultry. From 3,500 to 5,500 feet is probably the region of greatest rain-fall. The Yungas collections were chiefly made at elevations of 3,000, 4,000 and 6,000 feet.

Leaving La Paz on the 10th of January, 1886, we were at once overtaken by the unprecedented rains of that season. At Sorata, on the base of Mount Iliampu, we were detained by floods from the latter part of January till about the first of March. But little could be dried, and that little with the greatest difficulty, many of the collections being repeated once and some of them twice. In transit to the coast moreover, the continuous rains succeeded in penetrating some of the bales. A fine and little known alpine flora exists on Mt. Iliampu. The altitude and conditions of this locality are a parallel of those of Unduavi. One day's journey to the northward we reach Ingenio del Oro, a gold washing establishment. This locality is also very similar to Unduavi, but has the richest flora (March) of any locality that I have ever visited. It is above timber line. Three days of miserable exposure were passed here, and all our collections spoiled. Two days more brought us to Mapiri, a section almost precisely like Yungas, where, at 2,500 to 5,000 feet, I remained during March and April, improving the fairly good weather in making enormous collections, which arrived home, after great vicissitudes, in very fair condition. Mapiri is the great centre of *Cinchona* culture in South America, and large collections of these plants were made, among them being many new hybrids. The run of eighty-four miles to Guanai, 2,000 feet elevation, was made on rafts by the force of the current in a little less than eight hours. Arriving at Guanai three weeks earlier, we should have encountered one of the most interesting floras in South America. However, as we lost nearly everything collected at this place, it mattered but little. The forests at that point consist almost wholly of *Mimoseæ*, in prodigious variety. These had all gone to fruit and made rather ill looking specimens. At this point the succulent plants, such as *Begonia*, *Oxalis* and Bromeliaceæ began to appear much less prominent. I had early abandoned the collection of such plants, foreseeing that they would crowd out all other work, owing to the unlimited time necessary to dry them.

Upon new and larger rafts we floated in eight days to Reyes, the mountains becoming smaller, and the banks lower and lower as we proceeded, until, just at the port of Reyes we cut through the outermost range of the Andean foothills. Here, at an altitude of 1,500 feet, the forests are broken by patches of pampa, which are projected into them from the South, and the varying conditions of lake and river, forest, plain and bog, produce a flora of surpassing interest. Nearly two months were passed in Reyes, and although sickness materially interfered, a handsome representation of between 400 and 500 species was secured. The whole of this collection, with the most of what we had brought from Guanai, 9,000 specimens in all, was found one morning sunken with our boat under fifteen feet of water. From this point on down the Beni, the country rapidly assumes the character of the Brazilian forest, with a dense tangle in the sombre shade below and a wealth of floral life high above upon the tree tops. The month of July was passed in journeying down this river and making occasional short stops to collect. At the junction of this river with the Madre de Dios, the centre of the rubber production of that district, two months were spent, and the finest part of my collection was prepared. Just below this junction begins the series of falls produced by the river's cutting its way through a series of low hills. During the two months that were required to make the tedious transit of these falls, I had ample time to complete my collection with a handsome addition. Many of the Andean species with which we had already become familiar, here re-appeared.

The entire collection includes somewhere about three thousand numbers, of which an average of ten specimes were collected.

THALLOPHYTA.

(I.)—DIATOMS.

The following species were found by Prof. C. H. Kain in a gathering from Sorata, Bolivia:—*Amphipleura Lindheimerii*, Grun.; *A pellucida*, Kütz.; *Amphora ovalis*, Kütz.; *Cocconema lanceolata*, Ehr.; *Cocconeis Pediculus*, Ehr.; *Cymbella stomatophora*, Grun.; *Epithemia gibba*, Kütz.; and var. *ventricosa*, Grun.; *E. Argus*, Kütz.; *Encyonema ventricosa*, Kütz.; *Gonphonema constricta*, Ehr.; *Melosira varians*, Ag.; *Navicula elliptica*, Kütz.; *N. tenella*, Breb.; *Pleurosigma Spencerii*, W. Sm ; *Surirella cardinalis*, Kitton, rare ; *Synedra capitata*, Ehr.; *S. Ulna*, Ehr.; and var. *amphirhynchus*, Ehr.; *S. Crotonensis*, Grun.; var. *constricta*, Kain, n. var,, a provisional name for what may be a new species.

It is sometimes the case in this gathering that *Amphipleura pellucida* and *A. Lindheimerii* are both slightly sigmoid, so that they in some degree appear like *Pleurosigmæ*.

(II.)—ALGÆ.

Determined by Prof. W. G. Farlow.

Coralina Chilensis, Dec., Tacna, Chili, and Pisco, (281, 282).

Prionitis pectinata, J. Ag., Tacna (283).
Gymnogongrus furcellatus, J. Ag., Tacna (284).
Ulva nematoidea, Bory., Tacna (286).

(III.)—FUNGI.

Determined by Prof. Farlow.

Lentinus villosus, Kl., near Yungas, Bolivia (248).
Exidia Auricula-Judæ, Fr., Mapiri, Bolivia (252).
Polyporus sanguineus, Fr., Yungas (254).
P. biformis, Kl., Yungas (255).
Xylaria multiplex, Kunze (?), Yungas (257b).

(IV.)—LICHENS.

Determined by Dr. J. W. Eckfeldt.*

Ramalina calcaris, Fr., var. *fraxinea*, Fr.
Usnea barbata, (L.,) Fr., var. *florida*, Fr., near Yungas (277).
Evernia sulcata, (Sw.), Nyl., Sorata, (269), and Unduavi, (272).
Alectoria Canariensis, Nyl., Unduavi, Bolivia (268).
Theloschistes chrysopthalmus, (L.), Norm., Sorata (270), var. *flavicans*, (Fr.), Wallr., Sorata (267).
Parmelia Camtschadalis, (Ach.), Esch., La Paz, Bolivia (273).
P. caperata, Ach., Yungas (262).
P. perforata, (Jacq.), Ach., var. *hypotropa*, Nyl., La Paz (274).
Physcia hypoleuca, (Muhl.), Tuckerm., Sorata (266).
Sticta damæcornis, Tuck., Yungas and Mapiri (258).
S. crocata (L.), Ach., Yungas (278).
Leptogium foveolatum, Nyl., Syn. i., 124, Yungas (263).
Stereocaulon furcatum, Nyl., Yungas (260).
S. tomentosum (Fr.), Th. Fr., Yungas and Sorata (271).
Cladonia cariosa (Ach.), Spreng., Yungas (259).
C. floerkiana, Fr., Yungas (275).
C. ceratophylla, (Sw.), Eschw., Yungas (276).
Cœnogonium Linkii, Ehrenb., Yungas (280).
Bæomyces fungoides, Ach., Unduavi (251).
Cora Pavonia, Nyl., Yungas (249).

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*Dr. Eckfeldt regrets that more attention was not given to the collection of Lichens in a region so interesting. It may be stated that the collection of the lower cryptogams was purely incidental, my excessive labors entirely preventing any special work in that direction. H. H. R.

CONTRIBUTIONS FROM THE HERBARIA OF
COLUMBIA COLLEGE.—No. 7.

The Genus Hicoria of Rafinesque.

BY N. L. BRITTON.

(Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. YV., No. 11.)

The Genus Hicoria of Rafinesque.

BY N. L. BRITTON.

"*Scoria* (*tomentosa*, *mucronata*, *alba*, *pyriformis*, *globosa*, *&c.*) *Juglans alba* L., *tormentosa*, *mucronata*, Mich., &c. The hickory."

This is what Mr. Rafinesque is made to say in the Medical Repository, 2d hexade, Vol. v., p. 352, in the year 1808, under the title "Prospectus of two intended works on North American Botany."

Those who do not regard priority of publication as the all-important item in biological nomenclature will doubtless consider the facts and conclusions here presented as entirely uncalled for, and will object to them on the ground of unnecessary introduction of new binomials for very familiar plants. While regretting the fact that in proposing changes of this kind it is quite impossible to please everybody, I am also assured that a large number of botanists will cordially welcome any move to restore old names, inasmuch as this tends to bring nomenclature to a stable basis—a result worth much momentary inconvenience. I am thus encouraged in calling the attention of American botanists to Rafinesque's generic name for the hickories, and am persuaded to believe that the literary recognition thus awarded is only too long delayed.

The hickories are among the most characteristic elements of the existing North American flora, and together form a genus as marked in structure as it is in geographical distribution, being entirely confined to East America, with two species occurring in Mexico. For some reason the older botanists failed to recognize their generic validity. They, without exception, grouped the hickories with the real walnuts, regarding and describing all as species of *Juglans*. Rafinesque was the first to record an opinion that they form a distinct genus and the name he proposed this should bear must certainly stand. His opinion is now shared by all.

I do not know which of the old masters was the first to refer to these trees. Loudon says that the Eastern Shag-bark was introduced in English gardens in 1629. Parkinson states on page 1414 of his Theatrum Botanicum (1640), alluding to this tree as "*Nux Juglans alba Virginiensis*, the White Walnut of Virginia. The tree hereof groweth more upright and spreadeth lesse (he is comparing it with the real walnuts), the leaves are alike and the nut smaller, much thicker and whiter in the outer, hard shell than any of the former sort, and the kernel within much lesse also, but white and as sweete." Plukenet's Almagestrum Botanicum (1696) p. 264, indicates four kinds as known to him:

(1). *Nux Juglans Virginiana folius vulgaris similis, fructu subrotundo, cortice duriore lævi.* The Hickory or White Virginian Walnut. Haec est illa nux quam nostrates vocant the Hickery, seu Pick-hickery Nut; cujus nucleis lac conficient, Indi quod vocant Hickery Milk. He refers to Parkinson's description above quoted. This description appears to have been applied to the Eastern Shag-bark.

(2). *Nux Juglans Virginiana alba minor, fructo nucis moschatæ simili, cortice glabro, summo fastigio veluti in aculeum producto.* He figures the nut on Plate 309, fig. 2, a and b, representing that of the Small-fruited Hickory.

(3). *Nux Juglans Virginiana alba, fructu parvo anguloso cortice lævi.* Represented on the same plate, fig. 2, c, being a small nut of the Eastern Shag-bark.

(4). *Nux Juglans angulosa major, Americana, fructu longiore, cortice albo lævi, summo vertice mucronata.* He figures both the foliage and the nut of this species (figs. 2 and 2 d), guesses that it came from New England, and, although he says that the seed is very bitter, I can only associate it with the Balsam Hickory.

Miller's Gardener's Dictionary (1731) rcognized, however, only two of those described by Plukenet, still under *Nux Juglans*, remarking that "the Virginian sorts are preserved as rarities by such persons who are curious in collecting the several sorts of trees."

I shall now attempt to trace in outline the history of the introduction into botanical literature of the names which the species we are now able to differentiate must bear. In this I have freely availed myself of the cited synonymy of the genus, and especially of the exhaustive display of it given by Professor C. S. Sargent, in the Forestry Report of the Tenth Census, comparing the references I have had occasion to use, but without noticing a single discrepancy.

Linnæus carried Miller's process of eliminating Plukenet's species still farther, for he records but a single species, viz: *Juglans alba* (Species Plantarum, Ed. I., p. 997. (1753). While his description and synonyms indicated that he had several species confounded, his specimens are of the Woolly Hickory or Moker Nut, as is stated by all recent authorities, and which I can now confirm from a recent inspection of them; they consist of leaves and staminate catkins. It is quite remarkable that he was unable to separate more species, when we recall the large number of oaks, maples, ashes and other North American forest trees that he described. On one of these old herbarium sheets I was much interested to note the following memorandum written in pencil: " Hickery Nut, forte genus novum, capsula 4-valvis." J. E. S. I cannot find that Sir J. E. Smith ever published anything on the subject. This name was in common use for the Moker Nut up to the appearance of the last edition of Bigelow's Florula Bostoniensis (1840).

The seventh edition of Miller's Gardener's Dictionary, published in 1759, brought in two additional species, *Juglans glabra*, the Pig Nut, and *Juglans ovata*, the Eastern Shagbark.

Humphrey Marshall's "Arbustum Americanum" appeared in 1785. He applied trinomial appellations to most of the species, regarding all the true hickories as varieties of *Juglans alba ;* indeed he defines no type of it. His *Juglans alba minima* has been referred to the Bitternut Hickory, and no doubt correctly so, although he calls it the Pig Nut, a name even yet applied to it in certain parts of the country. He names also *Juglans Pecan*, the Pecan Nut; the other forms described by him had already received names.

In 1796 the Western Shell-bark Hickory was described as

Juglans sulcata, by Wildenow, in his Berlinische Baumzucht, p. 154, together with several of the other species previously known.

In 1803, Michaux (Flor. Bor. Amer., ii., 192) divided *Juglans* into two sections, the one containing the real walnuts, the other the hickories, but he did not give them even sub-generic names, and described no species additional to those previously recorded.

The younger Michaux's Histoire des Arbres Forestiers de l'Amerique Septentrionale (1810), brought in *Juglans myristicæformis*, the Nutmeg Hickory, and *Juglans aquatica*, the Water Hickory.

We have now reached the time of Rafinesque, and his statement, given at the head of this article, is the first separation of the Hickories from the Walnuts, under a distinct name. Unfortunately the proof of his paper in the Medical Repository was not well read, and *Scoria* was printed for *Hicoria*. There need be no doubt of what was intended. Rafinesque says in his Florula Ludoviciana (1817), p. 109, "My name, *Hicorius*, long ago proposed, contains all the species of *Juglans*, which have trifid male flowers (instead of six-cleft), generally tetrandrous, and fruits with angular and quadrifid shells." He then characterizes two species, both of which were already known.

The next important phase in the history of the genus was the introduction of the generic name *Carya*, by Thomas Nuttall, in his Genera of North American Plants, published in 1818. Quite ignoring Rafinesque, he publishes the genus as containing species of *Juglans* of Linnæus and Willdenow, gives a list of nine species without their equivalents and with descriptions of three only, yet, inasmuch as many of his specimens are preserved, he is generally cited as author of the binomials. This injustice did not pass without a protest on the part of Rafinesque, for in the very next year he remarks as follows, in "Journal de Physique," &c., p. 260 (Vol. lxxxix., 1819): "*Hicorius*, Raf. Obs. Fl. Ludov., 1817, a été changé sans cause en *Carya*, N., nom posterieur radical et tres-mauvais." It is remarkable that he does not here refer to his publication in the Medical Repository nine years before. But the next statement that Rafinesque made, regarding the genus (Alsographia Americana, 1838, p. 65), makes evident what he had then intended. He says under the caption:

HICORIA OR HICKORY TREES.

"*Hicoria*, Raf., 1808. *Carya*, Nuttall, 1818, &c. As early as 1804 I proposed to separate the Hickories from the Walnuts, to which Muhlenberg objected. I did so in 1808, in my remarks on Michaux's Flora, and again in 1817, in my Florula Ludoviciana, giving the almost Grecian name of *Hicoria;* yet Nuttall changed it in 1818 (without mentioning my labor) into *Carya*, which merely means nut, and is as bad a name as that of *Nux*, given by Adanson to *Juglans* * * * ; some botanists have, however, adopted this bad name, but it is hoped will have no objection to my previous modification of it when they may know of my previous claim." Then follows a division of the genus into four sub-genera, under which species are mentioned without descriptions or equivalents. He also proposes three new species, all of which were previously known. It will be noticed that Rafinesque here refers to his remarks in 1808, on Michaux's Flora; these I have have hitherto been unable to find, unless he is alluding to the Medical Repository paper, which makes mention of Michaux's book, but his spelling of *Hicoria* in 1838, and reference to his former statements, leave no doubt of what he intended for the orthography of what the printer made *Scoria*. It is very strange that the misprint was never alluded to by the author.

In 1853 Major John LeConte described what he considered a new species of Pecan Nut, in the Proceedings of the Philadelphia Academy, of that year, p. 402. He remarks: "This species of *Hickorea*, which I found cultivated in Georgia, is a native of the State of Texas. * * * I have adopted Mr. Rafinesque's name *Hickorea* for the genus in preference to Mr. Nuttall's *Carya* on the ground of priority. Whatever may have been the errors or aberrations of Rafinesque, Nuttall was not justified in changing a name proposed by the former years before any publication of his own." He then describes *Hickorea Texana*, which Prof. Sargent has reduced to the common Pecan. I have not seen it.

In 1862, Casimir DeCandolle published a memoir on the Juglandeæ in Annales des Sciénces Naturales, (IV.), xviii., 33, where he described *Carya Texana* as a new species based on a specimen collected by Charles Wright in Eastern Texas, but in his subsequent monograph of the order for the Prodromus (Vol.

xvi., 2nd part, p. 145) he regards it as a doubtful species. This I have not seen.

The latest addition to the species is to be found in Hemsley's Botany of Central America, (Vol. iii., p. 162) published in 1883, where *Carya Mexicana*, Engelm., is described from Dr. Engelmann's manuscript, based on Parry and Palmer, No. 834½ from mountains near San Luis Potosi, at an altitude of 8,000 feet. After a careful examination of the materials preserved in the Philadelphia, Washington, Easton and New York Herbaria, I have not been able to reduce any of the species found in recent writings. I would, however, arrange them a little differently than has hitherto been done in order to bring out more natural alliances. It is a very perplexing genus, and I am not sure that any arrangement would be wholly satisfactory. The salient characters of one species are liable to appear in others, sometimes with considerable prominence, rendering it troublesome to refer certain individuals even when they are well known. Single herbarium specimens are, naturally, even more perplexing. My present notion of them is as follows:

(A.) Subgenus PACANIA, Raf., Alsogr. Amer., p. 65. Nut cylindical or oval, smooth, two-celled; staminate catkins in lateral, nearly sessile fascicles at the summit of shoots of the preceding year.

(1.) H. PECAN (Marsh.) (*Juglans Pecan*, Marsh., Arb. Amer., p. 69; (1785); *Juglans olivæformis*, Michx., Fl. Bor. Amer., ii., 192; (1803); *Carya olivæformis*, Nutt.)

(1a.) *H. Texana*, LeConte, Proc. Phila. Acad., 1853, p. 402. I am not at all satisfied that this can certainly be referred to the ordinary Pecan. There appear to be no specimens extant to illustrate the description, but the characters given would indicate that this may very well be a different species or variety, and this supposition is strengthened by the statement that the leaves of the Pecan are fully formed before those of the tree in question show the least sign of unfolding.

(B) Subgenus EUHICORIA. Nut more or less compressed (except in the last species), ovate, obovate, oval, or nearly globular; staminate catkins in threes on a common peduncle at the bases of shoots of the season

***Involucre of the fruit very thick, splitting freely nearly or quite to the base; middle lobe of the staminate calyx at least twice as long as the two lateral broader ones; seed sweet and delicious; nut ridged and angular.**

†Leaflets 5; bark shaggy.

(2.) H. OVATA (Mill). (*Juglans ovata*, Mill., Gard. Dict., No. 6, (1759); *Juglans alba*, Michx., Flor. Bor. Amer., ii., 193, (1803), not Linnæus; *Carya alba*, Nutt.)

(3) H. MEXICANA (Engelm.) *Carya Mexicana*, Engelm., in Hemsley, Bot. Cent. Amer., iii.. 162). This I place here provissionally, suspecting it to belong to this group, but staminate catkins have not been described.

††Leaflets 7 to 9; (rarely, some leaves produce 5.)

‡Bark close, foliage very pubescent and odorous.

(4.) H. ALBA (L.). *Juglans alba*, L., Sp. Plant., p. 997, (1753); *Juglans tomentosa*, Lam., Encyc. Meth., iv., 504, (1797); *Carya tomentosa*, Nutt. Dr. Torrey has described a var. *integrifolia* of this species in Bot. New York, ii., p. 182, t. 100, characterized as having nearly entire leaflets and smaller fruit. I have not seen any specimens with as entire leaflets as those figured.

Var. MAXIMA, (Nutt.). (*Carya alba*, Nutt., var. *maxima*, Nutt., Genera. ii., 221, has fruit twice the ordinary size. Rafinesque called it *H. maxima*. (Alsog., l. c.)

‡‡Bark shaggy; foliage puberulent.

(5.) H. SULCATA, (Willd.). *Juglans sulcata*, Willd.,* Berl. Baumzucht, p. 154, t. 7, 1796; *Carya sulcata*, Nutt. Besides the eastern stations reported for this tree we can add from Professor Porter's Herbarium, Alexandria, Huntingdon County, and Sellersville, Bucks County, Penn.

****Involucre of the fruit thin, not splitting freely to the base; lobes† of the staminate calyx nearly equal in length, the lateral ones broader; bark close.**

†Nut compressed-globular, or compressed-pyriform, smooth or slightly ridged.

‡Nut small, thin-shelled; leaflets 5 to 7, smooth.

(6.) H. MICROCARPA (Nutt.) *Carya microcarpa*, Nutt., Genera, ii., p. 221.) This must be regarded as a very critical species; excepting its thinner-shelled, generally smaller nut, I have been entirely unable to distinguish characters which will always separate it from the next. Professor Sargent has united it with the Eastern Shagbark, referring to it in the Forestry Report of the 10th Census, p. 133, as "a form with small, thin shelled nuts." I am very confident that its alliance is not with *H. ovata.* The mistake may have arisen from the fact that in the Herbarium of the Philadelphia Academy, a label of Nuttall's has been misplaced and pasted alongside of a flowering twig of *H. ovata.* But his original description, his authentic fruiting specimens both at Philadelphia and Kew, and the figure of the plant in his Sylva, prove that its affinities are not with the Shagbarks, but rather as I have placed it.

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*Casimir DeCandolle cites Duhamel as author of this name, but I have not been able to find it in his writings If he did describe the tree it was probably before Willdenow's book was published.

†In *H. microcarpa* the middle lobe is sometimes considerably longer than the lateral ones.

‡‡Nut larger, thick-shelled; leaflets 5 to 9.

(7.) H. GLABRA (Mill). (*Juglans glabra*, Mill., Gard. Dict., No. 5, (1759); *Juglans porcina*, Michx. f., Hist. Arbres Amer., i., 206, t. 9, (1810); *Carya glabra*, Torr.; *Carya porcina*, Nutt.) The size of the nut is given in Gray's Manual. (p. 449), at from 1½ to 2 inches long. While they do actually grow as large as this in the Southern States, the more correct figures for those of New York and the Middle States generally is not more than half these dimensions.

‡‡‡Nut smooth, very thin-shelled, with a very bitter seed; leaflets 7 to 9, ovate lanceolate, minutely glandular, pubescent beneath.

(8.). H. MINIMA (Marsh). *Juglans alba minima*, Marsh., Arb. Amer., p. 68, (1785); *Juglans amara*, Michx., f., Hist. Arbres Amer., i., 177, t. 4, (1810); *Carya amara*, Nutt.) The name *minima* applied by Marshall evidently refers to the size of the leaflets, which, as a general thing, are smaller at maturity than those of any other Northern species.

‡‡‡‡Nut thin-shelled, angular; seed bitter; leaflets 7 to 13, lanceolate-acuminate, somewhat falcate and inequilateral, slightly pubescent below.

(9.) H. AQUATICA, (Michx., f.) (*Juglans aquatica*, Michx., f., Hist. Arbres Amer., i., 182, t. 5; *Carya aquatica*, Nutt.) The northward range of this species may now be increased to Mob Jack Bay, Virginia, (Leggett.)

††Nut ovoid, smooth, extremely thick-shelled.

(10.) H. MYRISTICÆFORMIS, (Michx., f.) *Juglans myristi-*

cæformis, Michx., f., Hist. Arbres Amer., i., 211, t. 10; *Carya myristicæformis*, Nutt.)

With *Carya Texana*, C. DC., Ann. Sci. Nat. (IV), xviii., 33, I am entirely unacquainted.

The Herbaria are not without indications of additional forms to those I have been able to separate. Noteworthy among these is a specimen collected by Mr. Curtiss at Lookout Mountain, Tenn., and preserved in the National Herbarium. It is in fruit, and belongs, I suspect, to the group with thin husks. The fruit is oblong, an inch in length and strongly four-winged by the projecting edges of the involucre valves. The leaflets are uniformly seven, ovate-lanceolate, acuminate, and remarkably pale beneath, in which character it differs from all the species I know. There is a slight amount of pubescence on the rachis and midveins.

In the mountains of Sussex County, New Jersey, there occurs a form of *H. glabra*, which has more or less pubescence on the lower surfaces of the leaves, and particularly on the rachis at the base of the leaflets.

Contributions from the
Herbarium of Columbia
College. no. 8.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

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A Recent Discovery of Hybrid Oaks on Staten Island.

BY ARTHUR HOLLICK.

Plates LXXXIII–LXXXV.

One day during the past summer Mr. Wm. T. Davis, of Tompkinsville, Staten Island, brought to me some leaves of an oak tree which he had found growing in the neighborhood of Tottenville, Staten Island, N. Y. To my surprise and delight I recognized them as belonging to *Quercus heterophylla*, Michx.—the celebrated "Bartram Oak." On September 2d we visited the locality and found not only typical *Q. heterophylla*, but also a number of other peculiar forms, evidently hybrids, and including *Q. Rudkini*, Britton. On September 22d the trees were again visited; a careful study was made of them and their surroundings and a fine series of leaves and fruit collected. Probably no better opportunities for observation or finer specimens for study and comparison have ever been obtained, and the results have proved to be highly interesting. Two recognized species are added to the local flora of Staten Island and to the flora of New York State, and the northern range of *Q. heterophylla* is extended about thirty miles from its nearest previously-reported station. Considerable new light is also shed upon the question of the proper status of this latter form, in the botanical world, whether as a species, a variety or a hybrid, and, if the latter, what species are the probable parents.

The limits of this paper forbid an extensive review of the literature concerning these two interesting oaks, but for the benefit of all who may wish to study the subject I would refer to the account of *Q. Rudkini*, by Dr. N. L. Britton, in Vol. IX. No. 2, of the BULLETIN, and for *Q. heterophylla* to Mr. I. C. Martindale's "Notes on the Bartram Oak," read before the West New Jersey Surveyors' Association, Jan. 6, 1880, and subsequently published in pamphlet form by the author. As, however, everyone may not have access to these documents, I have thought that the following brief account of this latter oak—its history and the controversy regarding it—might not be out of place:

Some time during the early part of the last century a peculiar oak tree attracted the attention of botanists and others. It was a single individual, growing on the farm of Mr. John Bartram, on the banks of the Schuylkill, just above Philadelphia. From its location it received the name "Bartram Oak." It was also called "Burriers Oak," though why this latter name I have never been able to obtain the slightest clue. Just when the tree was first observed there does not appear to be any record, but it must have been prior to the year 1750, for on page 183 of Darlington's "Memorials of Bartram and Marshall" there is printed a copy of a letter which was written by Peter Collinson to John Bartram, from which I extract as follows:

Mch. 5th, 1750-1.

MY GOOD FRIEND JOHN:

Pray what is the reason I have no acorns from that particular species of oak that Dr. Mitchell found in thy meadow? And I observe, in thy specimens, two other narrow leaved oaks. As I have now ground enough I wish for a dozen good acorns of each. * * * *

Thine. P. COLLINSON.

This is, I believe, the earliest reference in literature to this oak. No scientific name was given to it nor was it even mentioned in Humphrey Marshall's "Arbustrum Americanum," published in 1785. Andreas Michaux's "Flora Boreali-Americana," published in 1803 and reprinted in 1820, does not enumerate it among the oaks, although it is evident that he must have been aware of its existence, as his son, F. André Michaux, says in his "Histoire des Arbres Forestiers de l' Amerique Septentrionale," published in French in 1810 and republished in English in 1819: (See Vol. 1, p. 75, 76; plate 18.) "BARTRAM OAK. *Quercus heterophylla.* Every botanist who has visited different regions of the globe must have remarked certain species of vegetables which are so little multiplied that they seem likely at no distant period to disappear from the earth. To this class belongs the Bartram Oak. Several English and American naturalists, who, like my father and myself, have spent years in exploring the United States, and who have obligingly communicated to us the result of their observations, have, like us, found no traces of this species except a single stock in a field belonging to Mr. Bartram on the banks of the Schuylkill, 4 miles from Philadelphia. This is a flourishing tree, 30 feet in height and 12 inches in diameter; and seems formed to attain a much greater development. * * * * I was at first disposed to consider this tree as a variety of the laurel oak, to which it bears the greatest affinity; but the leaves of that species are never indented, and not a stock of it exists within a hundred miles of Philadelphia."

This is no doubt the first published description and representation of this oak, and the very appropriate specific name given to it at that time by Michaux has fortunately not been subjected to any change by later botanists, so that there is no tangled skein of synonomy to unravel, and the specific title, *heterophylla*, "various leaved," will always serve it as its name, no matter whether it be classed as a variety, a species, or a hybrid. From the time of Michaux's description until about the year 1850 no other trees seem to have been found, and the only ones known were the original and a few seedlings from it. In fact, when the original tree was cut down, about the year 1840, it was thought that the species, if such it was, was exterminated. So that for a period of a hundred years the only material for study was from a single tree and its immediate progeny. This, however, did not prevent the botanists of that time from recording opinions in regard to it. Michaux, as before stated, gave to it a specific rank. Pursh said: "* * It is probably only a hybrid plant." * * Nuttall asked: "May not this be an anomalous variety of *coccinea?*" Torrey states unequivocally: "A hybrid." Gray, in his Manual published in 1848, says: "* * * doubtless a hybrid between *Q. Phellos* and *Q. falcata*, or some other species of that section." In the second edition of the Manual, published in 1856, he changes his opinion, and says: "* * * apparently a hybrid between *Q. Phellos* and *Q. tinctoria?*" In the fifth edition, published in 1867, he quotes De Candolle as referring it to a variety of *Q. aquatica*, and then says: "It is as likely to be a variety of *Q. Phellos*, with dilated and toothed or cut leaves." About the year 1855, however, some trees were discovered at Mt. Holly, N. J., (*Fide* specimen in Herb. Columbia College, marked "Mt. Holly, N. J., Aug. 25, 1855, W. Proctor,") and others were subsequently found at stations in New Jersey and Delaware by Messrs. Smith, Leidy, Burk, Martindale, Meehan, Austin, Canby, Commons and others, which have been the subjects of numerous papers, notes and discussions. Even in the light of this new material, however, I find that there is as much difference of opinion as ever. Englemann first considered it as a good species and subsequently decided that it was hybrid with probably *Q. Phellos* and *Q. coccinea* for parents. Leidy considered it a hybrid between *Q. Phellos* and *Q. palustris.* S. B. Buckley says, in describing the tree at Mt. Holly: "It is * * * in a thicket near several willow oaks (Quercus phellos), of which it is plainly one." Cope and Smith rather lean to the opinion that it is a variety of *Q. Phellos.* A number of other botanists might be quoted as naming *imbricaria, nigra* and other species from which it may have been derived, but in nearly every instance *Q. Phellos* is mentioned as being connected with it in some way. Trees have also been reported from the District of Columbia, Maryland, North Carolina and Texas, but I have not seen specimens from any of these localities and the published descriptions of them are rather vague and indefinite. If all the localities where *Q. heterophylla* has been found, between Newcastle County, Del., and Staten Island, N. Y., were marked upon a map, they would be included in a straight narrow strip of country about ten or twelve miles in width; and this limited belt would probably include nearly every specimen of this tree now definitely known to be in existence.

The Staten Island station, is, like all the others, on the Cretaceous formation. The situation is a low piece of wet, sandy woodland, about a quarter of a mile from the beach. This piece of woodland is several acres in extent and its most conspicuous trees are *Castanea, Pinus rigida, Quercus alba, Q. rubra, Q. stellata, Q. nigra, Q. coccinea, Q. tinctoria, Q. palustris,* and *Q. Phellos,* but the hybrids are confined to a very limited area, not more than half an acre in extent and entirely within the very restricted territory where *Q. Phellos* occurs*. The immediate neighbors in this group at the present time are *Q. palustris, Q. nigra, Q. tinctoria* and *Q. coccinea.* A careful count was made of all trees

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*In this connection it is a matter of interest to know that *Q. Phellos* does not grow in any other part of Staten Island.

which were considered hybrids, and an enumeration of twenty was the result. Three of these were *Q. Rudkini* and the others either typical *Q. heterophylla* or else members of the same series, showing *Q. Phellos* to be undoubtedly at one extreme and some one of the broad, lobed-leaved species at the other. Not more than fifteen trees of *Q. Phellos* were noted. The trees of *Q. Rudkini* are mostly low, with dark green coriaceous foliage, showing their relationship to *Q. nigra*. These, however, need not concern us, as I consider their proper status and relationship to be definitely settled, so that in what follows I shall confine myself to a discussion of the forms which include *Q. heterophylla*. These are evidently designed to be large, the tallest one being about 50 feet in height and 3 feet 8 inches in circumference, and having the appearance of a young and vigorous growing tree. The leaf and fruit of this tree are shown at fig. 1, plate LXXXV. As a rule the largest trees are those having the leaves most cut or lobed and the largest acorns, while the smaller trees approach nearer to the *Phellos* type. The leaves upon each tree, however, vary a great deal, although there is generally enough of some one prevailing form to give to each a decided individuality, and if they could be arranged side by side according to leaf form a graduated series would be the result, showing an almost imperceptible change from member to member.

The petioles are of medium length, varying from ¾ in. in the large, deeply lobed leaves, to ¼ in. in the entire leaved forms. The margins are either entire, wavy, lobed on one or both sides, or sinuate toothed with the teeth bristle pointed. In some there are bristles on the margin where a tooth or lobe is merely indicated by a slight inequality. As a rule they are rather thin, green both sides, somewhat tomentose along the midrib or at the junction of the midrib and main veins. In others the texture is somewhat coriaceous—approaching forms of *Q. Rudkini*. Fig. 3, Plate LXXXIV. represents an anomalous form, with thin, sparingly lobed leaves, covered over the entire under surface with a close light brown tomentum. The acorn is globose, flattened and with a deeper cup than the others. The general habit of the tree is slender and willow like, and it hardly appears to be a member of the series.

The venation is also a character which shows the transition between the simply pinnate veining of *Phellos* and the more complex branching of the broad, lobed forms. The acorns vary in shape from ovoid to almost globose, and, in size, from those of *Phellos* to others almost an inch in length by ¾ in. in diameter at the largest part. The cups are invariably saucer shaped, with closely appressed scales.

I made a special journey late in the season, to ascertain, if possible, whether anything could be learned from the autumnal coloring of the leaves, but I found them to be a uniform light yellow, turning brown.

From these observed facts I have finally come to the conclusion that we must consider. *Q. heterophylla* to be a hybrid, and further, that one of the parents is *Q. Phellos.* They are invariably associated together, or at least the former has never been found except in the immediate vicinity of the latter; and, added to this, we know that *Q. Phellos* does produce a hybrid with *Q. nigra* and that this hybrid occurs associated with *Q. heterophylla.* It would not, in fact, be a matter of surprise to me if we should eventually find that other hybrid forms have resulted from the influence of *Q. Phellos* over other species of the black oak group. As to the other probable parent of *Q. heterophylla* there is yet room for careful research, although I think that the discovery of these trees on Staten Island has considerably simplified the matter. The species mentioned by those who have written upon the subject are *aquatica*, *imbricaria*, *falcata*, *coccinea*, *tinctoria* and *palustris.* The first three may be thrown out of the calculation at once on account of their geographical range—not a single specimen of either having ever been found or reported within miles of our station. *Coccinea* and *tinctoria*, while showing a leaf form that is satisfactory, have acorns with deep cups, entirely distinct from those of *heterophylla. Palustris* has a cup of the required form, but the acorn is far too small, and the lobes of the leaves have a distinctive divergent characteristic which those of *heterophylla* have not. The only other probable species, and it is the only one which does not seem to have been considered by our botanists, is *rubra.* Why this species has not received the attention it deserves in this connection I am at a loss to understand, as both the leaf and acorn are eminently fitted to terminate one extreme of the series of which *Phellos* is the other, as I have endeavored to show in the accompanying plates. The only cause for hesitation which I have in accepting this as a satisfactory conclusion is that I failed to find trees of *rubra* growing in the immediate vicinity, although there are a number of them only a few hundred yards away. We should however remember that this species may have been present, associated with *Phellos*, years since, at the time when the existing large specimens of *heterophylla* were produced, probably 50 or 75 years ago. It may be that hybridization has not taken place in many years and that the young trees are merely seedlings from a few originals. This idea is strengthened in my mind from the fact that the largest and oldest trees come nearest to the type of *rubra*, while the smallest or youngest trees show a preponderance of the *Phellos* type—apparently showing a tendency to revert back to it. Dr. N. L. Britton has also pointed out to me a significant fact in this connection, viz.: that throughout the region where *heterophylla* has been found *Phellos*, *rubra*, and other members of the black oak group occur, but that to the eastward, in the Pine Barren region, *heterophylla* or *rubra* are not reported, although *Phellos* is abundant and *palustris* and other black oaks are present. In fact *heterophylla* only seems to occur where *Phellos* and *rubra* occupy a territory in common.

Algæ from Atlantic City, N. J.

COLLECTED BY S. R. MORSE.

The following species were collected at various times during the years 1884 to 1888 inclusive, and the specimens sent to me for examination; also in May, 1885, Mr. Morse and myself spent a few days together collecting. While this is certainly not a complete list of the algæ of Atlantic City, it contains quite a large number for a locality having no rocky shore whatever, but an open sandy beach in front, and muddy creeks and marshes in the rear.

Glœocapsa crepidinum, Thuret. Common on woodwork.

Entophysalis granulosa, Kütz. On shells, etc. Not previously reported on the American coast.

Polycystis pallida (Kütz.), Farlow. Mixed with other Cryptophyceæ.

Clathrocystis roseo-persicina, Cohn. Abundant on the marshes.

Sphærozyga Carmichælii, Harv. Common on muddy flats, and in shallow pools in the marshes.

Spirulina tenuissima, Kütz. In small quantity, mixed with *Oscillarias*, etc.

Oscillaria subuliformis, Harv. Mixed with other Cryptophyceæ.

O. subtorulosa (Bréb.), Farlow. With the preceding species.

Microcoleus chthonoplastes, Thuret. On the marshes, mixed with other algæ.

Lyngbya majuscula, Harv. Not uncommon, floating.

L. æstuarii, Liebm. Common on marshes, etc.

L. tenerrima, Thuret. In small quantity, among other algæ.

Calothrix confervicola, Ag. On various algæ.

C. crustacea (Schous.), Born., et Thur. On various algæ, frequently mixed with the preceding.

C. scopulorum, Ag. On woodwork, etc.

C. pulvinata, Ag. Common on piles of wharves and bridges.

Rivularia hospita, Thuret. On an oyster shell.

Isactis plana. Thuret. On shells.

Monostroma crepidinum, Farlow. On woodwork in a tidal creek.

Ulva Lactuca (L.), Le Jolis. Common, including var. *rigida*, Le Jolis, and var. *latissima*, Le Jolis.

U. enteromorpha, Le Jolis. Very common, including var. *lanceolata*, Le Jolis, var. *intestinalis*, Le Jolis, var. *compressa*, Le Jolis.

U. clathrata, Ag. Common, including var. *ramulosa*, and var. *erecta*, Le Jolis.

U. Hopkirkii (McCalla), Harv. Not very common.

U. marginata, Le Jolis. Not very common.

U. percursa, Ag. Rather common in tide-pools, mixed with other algæ, from which it is hardly distinguishable except by microscopic examination.

U. aureola, Ag. Not uncommon on woodwork.

Ulothrix flacca (Dillw.), Thuret.

U. isogona, Thuret. These two species not uncommon on woodwork and other algæ. A very slender form grows on *Bos-*

trychia rivularis, possibly distinct from either of the foregoing.

Chætomorpha Picquotiana (Mont.), Kütz.

C. Linum, Kütz. It is impossible to draw the line between these two species in the Atlantic City specimens. Typical forms of each may be found, and so can every shade between them.

Rhizoclonium riparium, Roth. Common.

Cladophora albida (Huds.), Kütz. Beside the type, a plant occurs, which seems to be the *C. refracta* of Harvey, (Phyc. Brit.,) and is probably a form of *C. albida*, in which Hauck (Deutschland's Meeresalgen) includes *C. refracta* of Harv. and Kütz. The plant of the New England coast which I take to be the *C. refracta* of Farlow's Man., is quite distinct. Hauck places the latter as *forma refracta* in *C. hamosa*, Kütz.

C. glaucescens, Harv. Not uncommon.

C. Hutchinsiæ, Kütz. Not uncommon. Luxuriant specimens from Longport, collected by Mrs. Lawton.

Cladophora flexuosa, Harv. A doubtful species, but some specimens found at Atlantic City seem to belong here.

C. gracilis (Griff.), Kütz. Common and variable.

C. expansa, Kütz. Common, especially in marsh tide-pools.

Bryopsis plumosa (Kütz.), Ag. Not uncommon.

Phyllitis fascia, Kütz. Common.

Scytosiphon lomentarius, Ag. Common.

Punctaria latifolia, Grev.

P. latifolia, Grev., var. *Zosteræ*, Le Jolis.

P. plantaginea (Roth.), Grev. All three forms rather common.

Dictyosiphon fœniculaceus, Grev. Common, including forms which appear to be var. *flaccidus*, Aresch.

Myriotrichia clavæformis, Harv.

M. clavæformis, Harv., var. *filiformis*, Farlow. On *Scytosiphon* and *Phyllitis*.

Ectocarpus terminalis, Kütz. On *Zostera*.

E. tomentosus (Huds.), Lyng. Rather common.

E. granulosus, Ag. Not uncommon.

E. confervoides (Roth.), Le Jolis. Very common.

E. confervoides, var. *siliculosus*, Kjellman. Almost as common as the type.

E. littoralis, Lyngb. Very common and variable. Among other forms the var. *brachiatus*, Ag. (*E. ramellosus*, Kütz.)

Myrionema vulgare, Thur. Common.

Elachistea fucicola, Fries. Common on *Fucus*.

Leathesia difformis (L.), Aresch. Not very common; generally of small size, growing on *Zostera*.

Chordaria flagelliformis, Ag. Have only seen a few plants.

Mesogloia divaricata, Kütz. Not uncommon.

Ralfsia verrucosa, Aresch. A small form, growing on wood-work.

R. clavata (Carm.), Crouan. With the preceding.

Laminaria saccharina (L.), Lamour. Not rare, but not so common nor so luxuriant as further north. Washed ashore from below low water mark.

Ascophyllum nodosum (L.), Le Jolis. Common.

Fucus vesiculosus, L. Common.

F. furcatus, Ag. A single plant, washed ashore, apparently having grown on a mussel bed below low water mark. Not exactly like the form as found on the New England coast; having some resemblance to *F. evanescens*, Ag.

Sargassum vulgare. Ag. Have only seen a few plants; apparently not very common.

Vaucheria Thuretii, Woronin.

V. litorea, Nordstedt. Have seen only sterile plants of these two species, so that the determination is not certain.

Trentepohlia virgatula (Harv.), Farlow. On *Zostera* and algæ.

Porphyra laciniata, Ag.

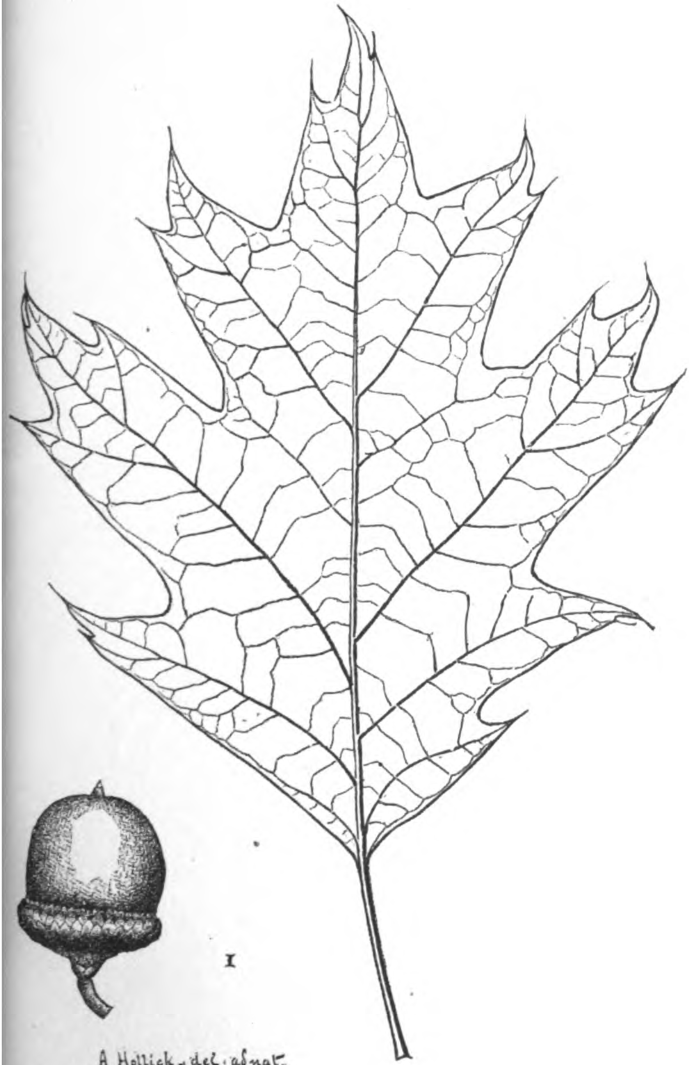
P. leucosticta, Thuret. Both species common and often confounded.

Bangia fusco-purpurea, Lyngb. Rather common.

Erythrotrichia ceramicola (Lyngb.), Aresch. On various algæ.

Callithamnion cruciatum, Ag. Not uncommon. This species is distributed along the Atlantic coast of Europe and North America, and also in the Mediterranean, and is not a rare species anywhere in those limits. The cystocarpic fruit, however, has been considered extremely rare, the only record of its occurrence being at Brest, France, reported by Crouan. At Atlantic City, however, the cystocarpic fruit seems to occur quite commonly, a considerable proportion of the

Bulletin of the Torrey Botanical Club. Plate LXXXIII.



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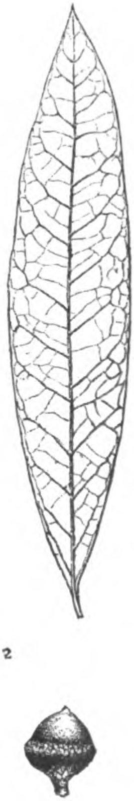
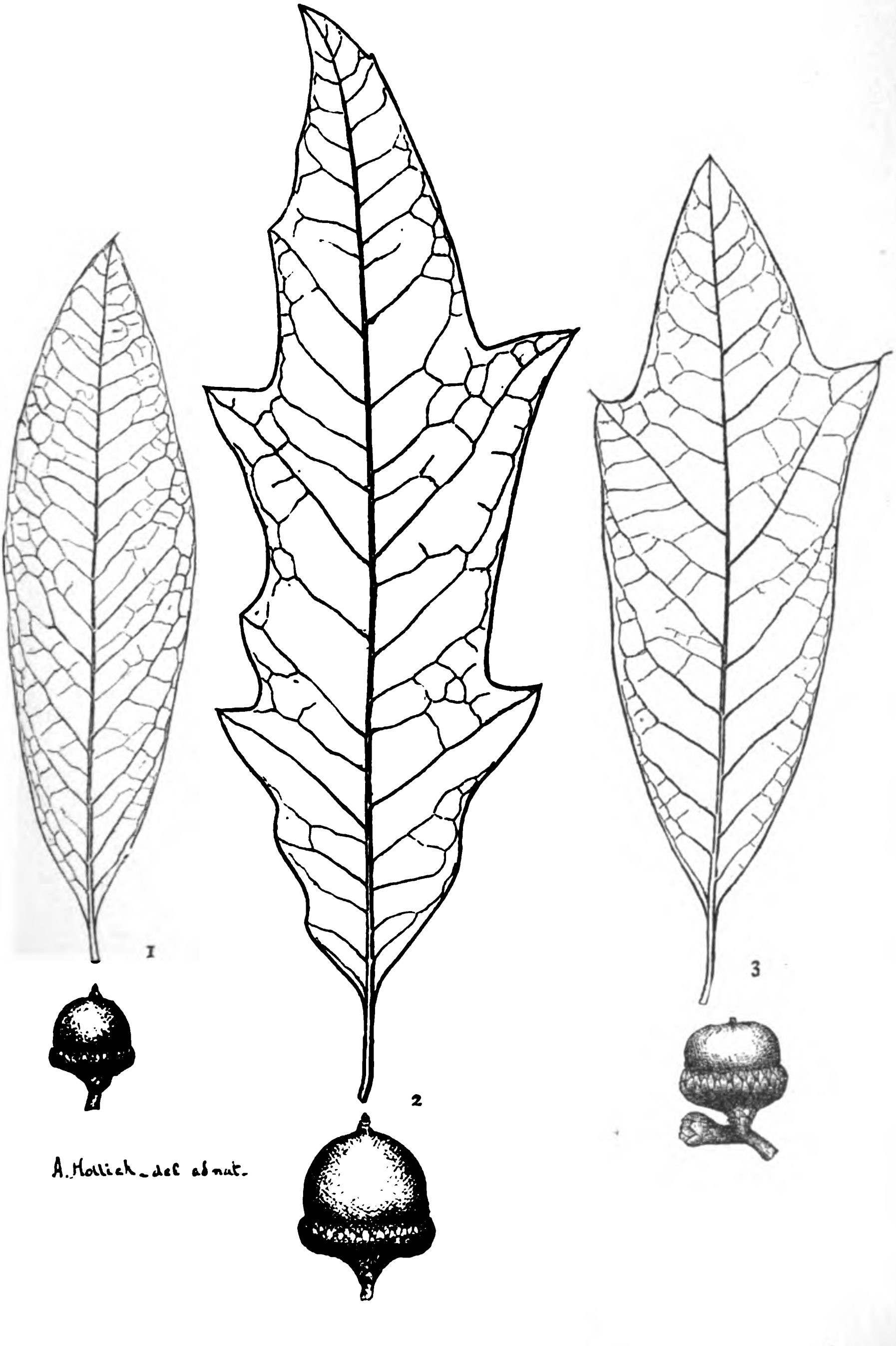


Fig. 1. Quercus rubra, L. Fig. 2. Quercus Phellos, L.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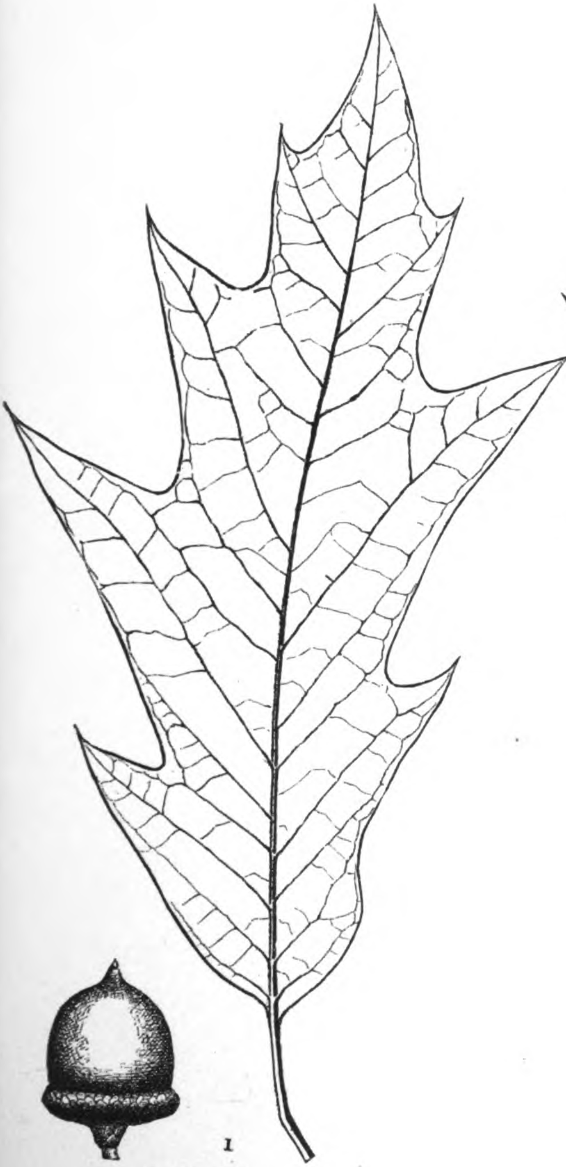
Quercus heterophylla, Michx.



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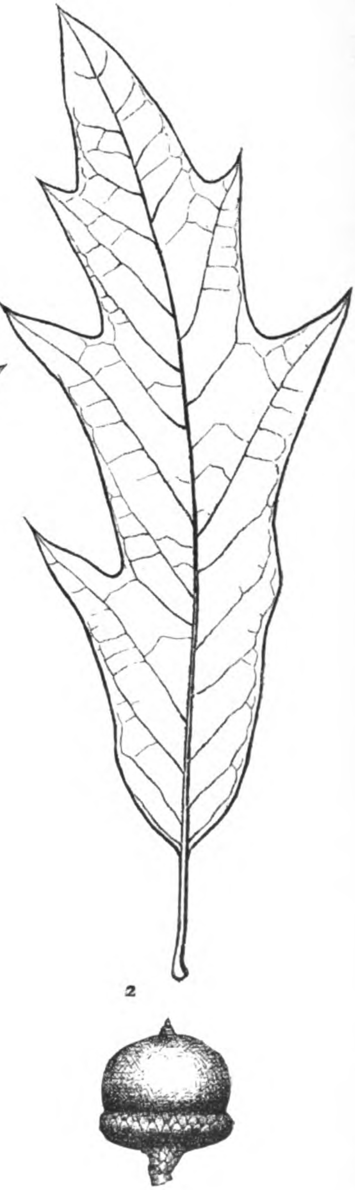

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Quercus heterophylla, Michx.

CONTRIBUTIONS FROM THE HERBARIUM OF COLUMBIA COLLEGE—No. 9.

A LIST OF PLANTS COLLECTED BY DR. E. A MEARNS AT FT. VERDE AND IN THE MOGOLLON AND SAN FRANCISCO MOUNTAINS, ARIZONA,

1884–1888.

BY N. L. BRITTON.

THE GENERAL FLORAL CHARACTERS OF THE SAN FRANCISCO AND MOGOLLON MOUNTAINS OF ARIZONA AND NEW MEXICO, AND THE ADJACENT REGION.

BY H. H. RUSBY.

(Reprinted from TRANSACTIONS OF THE NEW YORK ACADEMY OF SCIENCES, Vol. VIII., 1888–1889.)

A LIST OF PLANTS COLLECTED AT FORT VERDE AND VICINITY AND IN THE MOGOLLON AND SAN FRANCISCO MOUNTAINS, ARIZONA, 1884–1888, BY DR. E. A. MEARNS, U. S. A.

(With description of new species.)

BY N. L. BRITTON.

The collections here enumerated were sent by Dr. Mearns to the American Museum of Natural History, and were thence referred to me for determination by Mr. L. P. Gratacap. A complete set exists at the Museum, and another nearly complete one has been placed in the Herbarium of Columbia College. A few duplicates have been distributed.

It is to be hoped that Dr. Mearns will continue his botanical explorations; for in the recesses of the mountains of this portion of Arizona there doubtless occur other species and varieties as yet unknown to science. It is not likely that the following list contains the names of more than one-third of the plants which are to be found in the district. Dr. Rusby's account of the general floral features of the country, written from studies made by him in 1881–1882, at the time he made his very extensive gatherings which contain so much that is novel and interesting, will forcibly supplement my bare cataloguing of the species.

RANUNCULACEÆ.

Anemone cylindrica, Gray. Baker's Butte (51).
Anemone decapetala, L. San Francisco Mts. (15).
Thalictrum Fendleri, Engelm. Baker's Butte. (16).
Ranunculus affinis, R. Br. Mogollon Mts. and east slope of San Francisco Mts. (90 and 17).

Ranunculus Arizonicus, Lemmon, var. *subsagittatus*, Gray. Baker's Butte (75 *and* 76).

Aquilegia Canadensis, L. Flagstaff (157).

Aquilegia chrysantha, Gray. Little Squaw Peak (144); Baker's Butte (87); Clark's Valley (20).

Delphinium scopulorum, Gray. Baker's Butte, (256).

Delphinium scaposum, Greene. Fort Verde (255).

BERBERIDEÆ.

Berberis repens, Lindl. Baker's Butte (83).

Berberis Fremonti, Torr. Fort Verde (266).

PAPAVERACEÆ.

Platystemon Californicus, Benth. Fort Verde (205).

Eschscholtzia Mexicana, Greene. Fort Verde (192).

Corydalis aurea, Willd., var. *occidentalis*, Gray. Fort Verde (172 and 305).

CRUCIFERÆ.

Streptanthus cordatus, Nutt. Fort Verde (269).

Cardamine cordifolia, Gray. Fort Verde (293).

Lesquerella Fendleri (Gray), Wats. Fort Verde (310).

Physaria Newberryi, Gray. A form with short style and bunched inflorescence, associated by Dr. Watson with specimens collected by Matthews in western Texas. Crater Butte, east of San Francisco Peaks (28).

Sisymbrium canescens, Nutt. Fort Verde (336). I have elsewhere followed Professor Greene in the use of the name *pinnatum* for this species. But there is already a *S. pinnatum*, Barneoud in Gay, Flor. Chil. i. 125 (1845), rendering Walter's earlier *Erysimum pinnatum* unavailable for the plant.

Erysimum lanceolatum, Pursh. (*E. asperum*, DC). The *E. lanceolatum* R. Br., which as a binomial antedates Pursh's by two years, has a variety of older specific names, and is referred by Koch in Syn. Flor. Germ. and Helv. to *E. Cheiranthus* Pers., which leaves the name adopted here as valid for the species. Fort Verde (149 and 315).

STANLEYA PINNATA (Pursh). *Cleome pinnata*, Pursh, Flor. Amer. Sept. ii. 739 (1814); *S. pinnatifida*, Nutt., Genera, ii. 71 (1818). Originally described as *Cleome*, it has much in common with that genus. Fort Verde (280).

Lepidium alyssoides, Gray. Fort Verde (309).

Biscutella Wislizeni (Engelm.), Wats. Fort Verde (270 and 341).

Thlaspi alpestre, L. San Francisco Mountains (34).

CAPPARIDEÆ.

Cleome lutea, Hook. Fort Verde (196).

Cleome serrulata, Pursh, Flor. Bor. Amer. ii. 441 (1814); *C. integrifolia*, T. & G., Flora N. A. i. 122 (1838). Fort Verde (195).

VIOLARIEÆ.

Viola palmata, L., var. *cucullata* (Ait.), Gray. San Francisco Mountains (7).

Viola pedatifida, Don. Mogollon Mountains (44).

Viola Nuttallii, Pursh. Fort Verde (291).

Viola Canadensis, L., var. SCARIOSA, Porter, *n. var.* Stipules scarious, 0.2–0.8 in. long, very prominent about the base of the stem and much larger than those of the eastern plant; flowers much smaller. Western base of the San Francisco Mountains (19); Mehren's Ranch, Mogollon Mountains (94). With this I would associate a specimen collected by Dr. Newberry at Lake City, Col., in 1881.

POLYGALEÆ.

Polygala Rusbyi, Greene. Fort Verde (323).

Polygala alba, Nutt. Fort Verde (327).

Krameria parvifolia, Benth. Fort Verde (259).

CARYOPHYLLEÆ.

Silene Thurberi, Wats. Near Fort Verde (72).

Silene laciniata, Cav. Rim Rock, Tonto Basin (137).

Arenaria Rusbyi, Greene. Bloody Basin, between Forts Verde and McDowall (339).

HYPERICINEÆ.

Hypericum formosum, H. B. K. Baker's Butte, Mogollon Mts. (99).

PORTULACEÆ.

Portulaca parvula, Gray. Fort Verde (254).

TAMARISCINEÆ.

Fouquiera splendens, Engelm. Squaw Peak (173).

MALVACEÆ.

Sidalcea Neo-Mexicana, Gray. Mogollon Mts. (64).

Anoda hastata, Cav. Copper Cañon (185).

Sida lepidota, Gray. Fort Verde (191).
Sphæralcea Munroana (Dougl.), Spach. Fort Verde (150 and 225).

LINEÆ.

Linum aristatum, Engelm.? Specimens in flower, the corolla 2 cm. wide, with a dark centre; styles capitate. Fort Verde (314).
Linum perenne, L. Fort Verde (268).
Linum Neo-Mexicanum, Greene. Mogollon Mountains (68).

ZYGOPHYLLEÆ.

Tribulus grandiflorus (Torr.), Wats. Fort Verde (170).
Tribulus maximus, L. Bloody Basin, 42 miles southwest of Fort Verde (333).
Larrea Mexicana, Moric. Fort Verde (181).

GERANIACEÆ.

Geranium Richardsonii, Fisch. & Meyer. Mogollon Mountains (89).
Geranium cæspitosum, James. Mogollon Mountains (104).
Erodium cicutarium (L.), L'Her. Fort Verde (304).
Oxalis divergens, Benth. Baker's Butte, (112).
Oxalis corniculata, L. San Francisco Mountains (31).

RUTACEÆ.

Canotia holacantha, Torr. Fort Verde (242).
Ptelea augustifolia, Benth. Fort Verde (209 and 294).

CELASTRINEÆ.

Pachystima Myrsinites (Pursh), Raf. Weber Creek, Tonto Basin (140).

RHAMNEÆ.

Rhamnus Californica Esch., var. *tomentella* (Benth.), Brew. and Wats. Tonto Basin.
Ceanothus Greggii, Gray. Fort Verde.
Ceanothus Fendleri, Gray. Mogollon Mts. (122).

SAPINDACEÆ.

Negundo aceroides, Mœnch. Verde River (207).

ANACARDIACEÆ.

Rhus aromatica, Ait., var. *trilobata* (Nutt.), Gray. Fort Verde (328).

Rhus glabra, L. Fossil Creek. (272).

LEGUMINOSÆ.

Thermopsis montana, Nutt. Baker's Butte (80).

Lupinus argenteus, Pursh. San Francisco Mts. (21); Baker's Butte (74); Bishop's Creek (343).

Melilotus Indica (L.), All. Fort Verde (324).

Trifolium involucratum, Willd. Mogollon Mts. (53).

HOSACKIA MEARNSII, *n. sp.* Perennial, herbaceous, densely silky canescent all over; stems branched, 6–8 inches high; leaves 3–5–foliolate, petioles short; leaflets obovate-cuneate, obtuse or even truncate at the apex, one-quarter inch long, three-eighths inch wide, stipules very minute and gland-like; peduncles slender, about two inches long, two to four flowered; flowers three-fourths of an inch long, orange-red and showy, pod silky canescent, about the length of the flowers, tipped with the smooth, persistent style, which is over an eighth of an inch long, and in some cases has the stigma still remaining. Fort Verde (342).

Hosackia puberula, Benth. Fort Verde (295).

Hosackia Wrightii, Gray. Fort Verde (262); Baker's Butte (91).

Dalea formosa. Torr. Fort Verde (11).

Robinia Neo-Mexicana, Gray. Mogollon Mts. (129).

Astragalus candicans, Greene. Fort Verde (297).

Astragalus decumbens (Nutt.), Gray. Bishop's Creek (350).

Astragalus Missouriensis, Nutt. Fort Verde (345).

Astragalus Nuttallianus, DC. Fort Verde (335).

Astragalus Pattersoni, Gray? Fort Verde (154, 163 and 303).

Vicia Americana, Muhl. Little Squaw Peak (146); Baker's Butte (98).

Lathyrus decaphyllus, Pursh. (*L. polymorphus,* Nutt.). Fort Verde (167).

LATHYRUS ARIZONICUS, *n. sp.* Glabrous throughout; stems slender, angular, less than a foot long; leaflets one or two pairs, sessile, or nearly so, linear-lanceolate, one to two inches long, one-quarter inch wide, entire, venose, especially below; stipules ovate, acuminate, about one-quarter inch long, peduncles one or two flowered, one inch long; flowers half an inch long, white. Summit of mountain, north of wagon-pass over Mogollon Mountains at Mehren's Ranch. May 27, 1887 (57).

Cologania longifolia, Gray. Mogollon Mts. (107).

Phaseolus Wrightii, Gray. Apparently this species. Baker's Butte (231).
Hoffmanseggia drepanocarpa, Gray. Fort Verde (197).
Prosopis juliflora, DC. Fort Verde (353).
Cassia bauhinioides, Gray. Fort Verde (229).
Calliandra reticulata, Gray. Fort Verde (139).

ROSACEÆ.

Spiræa discolor, Pursh. Clear Creek, near Fort Verde (248).
Geum strictum, Ait. Baker's Butte (59).
Fragaria Virginiana, Duschesne. Mogollon Mts. (71).
Potentilla fruticosa, L. Mogollon Mts. (243).
Potentilla Thurberi, Gray. Mogollon Mts. (50). This is the very silky form of the species, with large flowers, the same as Dr. Rothrock's No. 399 from Mt. Graham, and Dr. Rusby's No. 128, also from the Mogollons. Dr. Mearns collected other specimens, the exact locality uncertain, which are smoother and smaller-flowered, much more nearly resembling the originals of Thurber and Henry. This silky form from the higher mountains may, perhaps, best be separated as a variety.
Geum Rossii, Ser. Mogollon Mts. (101).
Rosa Fendleri, Crèpin. Baker's Butte (82).
Amelanchier alnifolia, Nutt. Mormon Dairy Mt. (42); Ft. Verde (329).

SAXIFRAGEÆ.

Saxifraga nivalis, L. ? San Francisco Mts., altitude 12,000 ft. (26).
Heuchera rubescens, Torr. var. *nana*, Gray. Pl. Wright. ii. 64. I think it probable that this will eventually prove to be a distinct species. Dr. Torrey has expressed that opinion on the label of the Mexican Boundary Survey collection in his herbarium. Rim Rock, Tonto Basin (138).
Fendlera rupicola, Engelm. and Gray. Ft. Verde (298).
Ribes aureum, Pursh. Fort Verde (299).
Ribes Cynosbati, L. San Francisco Mts. (131).

CRASSULACEÆ.

Cotyledon Nevadensis, Wats. ? Bloody Basin, between Forts Verde and McDowall (338).

ONAGRARIEÆ.

Epilobium spicatum, Lam. Baker's Butte (62).
Œnothera biennis, L. var. *grandiflora* (Ait.), Lindl. Mogollon Mts. (47).

Œnothera scapoidea, Nutt. Fort Verde (311).
Gaura coccinea, Nutt. Base of Little Squaw Peak (145); Fort Verde (347). Dr. Mearns remarks that this is a great "bee-plant."
Œnothera speciosa, Nutt. Fort Verde (330).

LOASEÆ.

Mentzelia albicaulis, Dougl. Fort Verde (278).
Mentzelia Wrightii, Gray. Fort Verde (240).

CUCURBITACEÆ.

Cucurbita fœtidissima, Kunth. Fort Verde (325).
MICRAMPELES GILENSIS (Greene). (*Echinocystis Gilensis,* Greene, Bull. Cal. Acad. Sci. i. 189). Fort Verde (165).

UMBELLIFERÆ.

Ligusticum montanum, Gray. San Francisco Mts. (35); Mogollon Mts. (103) purple-flowered forms; Fort Verde, a white-flowered form (307).
Carum Gairdneri (Nutt.), Anderson. Mogollon Mts. (54).
Cymopterus montanus, T. and G. var. *purpurascens,* Gray. Fort Verde (153).

CORNACEÆ.

Cornus stolonifera, Michx. Baker's Butte (106).

CAPRIFOLIACEÆ.

Sambucus racemosus, L. Mogollon Mts. (27).
Lonicera ciliosa (Pursh), Poir. Mogollon Mts. (244).
Lonicera involucrata (Richards.), Banks. Mogollon Mts. (29).

RUBIACEÆ.

Houstonia angustifolia, Michx. A small form. Baker's Butte (115).
Houstonia Wrightii, Gray. Baker's Butte (52).

VALERIANEÆ.

Valeriana edulis, Nutt. Mogollon Mts. (65).
Valeriana sylvatica, Banks. Western base of San Francisco Mountains (12).
Valeriana Arizonica, Gray. Mogollon Mts. (95).

COMPOSITÆ.

Brickellia grandiflora (Hook.), Nutt., var. *petiolaris*, Gray. Fort Verde (233).

Brickellia baccharidea, Gray. Fort Verde (180).

Gutierrezia Sarothræ (Pursh), Brit. & Rusby. Fort Verde (194 and 261).

Solidago Canadensis, L. Fort Verde (263).

Solidago Missouriensis, Nutt. Tonto Basin (143).

Aster foliaceus Lindl., var. *Burkei*, Gray. Near Fort Verde (276).

Aster spinosus, Benth. Fort Verde (212).

Aster canescens, Pursh. Fort Verde (148, 217 and 223).

Erigeron macranthus, Nutt. Fort Verde (232).

Antennaria dioica (L.), Gærtn. Mogollon Mts. (96).

Var. *congesta*, DC., Allen's Park, Mogollon Mts. In grassy parks within the pine forests (40). This would appear from the present specimens to be specifically distinct, but intermediate forms are reported to occur.

Melampodium cinereum, DC. Fort Verde (190 and 308).

Parthenium incanum, H. B. K. Fort Verde (178).

Ambrosia aptera, DC. Copper Cañon (234).

Xanthium Canadense, Mill. Fort Verde (220).

Zinnia grandiflora, Nutt. Fort Verde (239).

Sanvitalia Aberti, Gray. Copper Cañon (182).

Rudbeckia laciniata, L. Baker's Butte (77).

Wyethia Arizonica, Gray. Crater Butte (24); Baker's Butte (116).

Encelia Californica, Nutt. Fort Verde (321).

Verbesina encelioides (Cav.), Benth. & Hook. in Gray, Syn. Flor. Gam. i. 288. Fort Verde (221).

Coreopsis tinctoria, Nutt. Natural Bridge, Tonto Basin (267).

Chænactis stevioides, H. & A. Fort Verde (317).

BAHIA DISSECTA (Gray). *Amauria* (?) *dissecta*, Gray. Mem. Amer. Acad. iv. 104 (1849); *Villanova chrysanthemoides*, Gray, Smithsonian Contr. v. 96 (1853); *Bahia chrysanthemoides*, Gray, Proc. Amer. Acad. xix. 28 (1883). Copper Cañon. A form with involucral scales not acuminate (183).

Hymenatherum acerosum (DC.), Gray. Fort Verde (189).

Hymenatherum pentachætum, DC. Fort Verde (175).

Pectis Rusbyi, Greene. Copper Cañon (184).

Helenium Hoopesii, Gray. San Francisco Mts. (14).

Gaillardia aristata, Pursh. Fort Verde (322).

Achillea Millefolium, L. Baker's Butte (88).

Baileya pleniradiata, Harv. & Gray. Fort Verde (177).

Senecio Rusbyi, Greene. Baker's Butte (275).

Senecio Thurberi, Gray. East slope of San Francisco Mts., altitude 11,500 ft. (25).

Senecio Neo-Mexicanus, Gray. Squaw Peak, near Fort Verde (171).

Specimens collected at Mehren's Ranch, Mogollon Mts., are also referred to this species with some hesitation.

Senecio Douglasii, DC. Cherry Creek (346).

Cnicus Neo-Mexicanus, Gray. Cherry Creek (340).

Perezia nana, Gray. Fort Verde (236).

Malacothrix Fendleri, Gray. Fort Verde (316).

Calycoseris Wrightii, Gray. Fort Verde (202).

LOBELIACEÆ.

Lobelia splendens, Willd. Fort Verde (273).

ERICACEÆ.

Arctostaphylos tomentosa (Pursh), Dougl. Tonto Basin (334).

Pyrola picta, Smith. Mogollon Mts. (85).

Chimaphila umbellata (L.), Nutt. Tonto Basin (136).

MONOTROPEÆ.

Pterospora andromedea, Nutt. Baker's Butte (130).

Hypopitys Monotropa, Crantz. Baker's Butte (100).

PRIMULACEÆ.

Primula Parryi, Gray. San Francisco Mts. (5).

Androsace septentrionalis, L. Clark's Valley, Mogollon Mts. (126).

Steironema lanceolatum (Walt.), Gray, var. *hybridum* (Michx.), Gray. Baker's Butte (70).

APOCYNACEÆ.

Amsonia Palmeri, Gray. Fort Verde (152).

Apocynum androsæmifolium, L., Mogollon Mts. (48).

ASCLEPIADEÆ.

Asclepiodora decumbens (Nutt.), Gray. Fort Verde (166).

Asclepias Mexicana, Cav. Fort Verde (235).

Asclepias brachystephana, Engelm. Fort Verde (169).

Asclepias tuberosa, L., Mogollon Mts. (123).

Philibertia viridiflora (Torr.), Brit. & Rusby. Fort Verde (238).

GENTIANEÆ.

Erythræa calycosa, Buckl. Fort Verde (226).
Frasera speciosa, Dougl. Mogollon Mts. (245).

POLEMONIACEÆ.

Phlox Douglasii, Hook. Fort Verde (296).
Gilia aurea, Nutt. Fort Verde (204).
Gilia floribunda, Gray. Fossil Creek (249).
Gilia floccosa, Gray. Fort Verde (247).
Gilia inconspicua, Dougl., var. *sinuata* (Dougl.), Gray. Fort Verde—a form with very large flowers, the corolla-tube yellowish and the limb purple (201).
Collomia aggregata (Pursh), Torr. Mogollon Mts. (49); Copper Cañon (187).
Polemonium confertum, Gray. San Francisco Mts. (36). Agassiz Peak (102).
Polemonium flavum, Greene. Cañon of Clear Creek, fifty miles from its confluence with the Rio Verde (160).

HYDROPHYLLACEÆ.

Phacelia crenulata, Torr. Fort Verde (260 and 313).

BORAGINEÆ.

Mertensia lanceolata (Pursh), DC. San Francisco Mts. (6).
Mertensia paniculata (Ait.), Don. Cañon of Clear Creek (162).
Onosmodium Thurberi, Gray. Cañon of Clear Creek (161).
Lithospermum multiflorum, Torr. Baker's Butte (81).

CONVOLVULACEÆ.

Ipomœa coccinea, L. Fort Verde (230).
Ipomœa Mexicana, Gray. Fort Verde (262).
Ipomœa costellata, Torr. Copper Cañon (274).
Convolvulus sepium, L. Flagstaff (158).
Convolvulus incanus, Vahl. Fort Verde (211).
Cuscuta arvensis, Beyrich ? Fort Verde (222).

SOLANACEÆ.

Chamæsaracha Coronopus (Dunal), Gray. Fort Verde (214).
Datura meteloides, DC. Fort Verde (271).
Lycium pallidum, Miers. Fort Verde (349).

SCROPHULARINEÆ.

Maurandia antirrhinæflora, Wild. Copper Cañon (186).
Pentstemon barbatus (Cav.), Nutt. Baker's Butte (79); Fort Verde (257); also a scapose form from Mogollon Mts. (114).
Pentstemon Palmeri, Gray. Beaver Creek (200).
Pentstemon spectabilis, Thurb. Fort Verde (292).
Mimulus luteus, L. Fort Verde (290 and 320).
Castilleia pallida (L.), Kunth, var. ACUMINATA (Pursh). *Bartsia acuminata,* Pursh, Fl. Amer., Sept. ii., 429 (1814); *C. septentrionalis,* Lindl. Bot. Reg. t. 925 (1824). Mogollon Mts. (60).
Castilleia parviflora, Bong. Squaw Peak (147).
Castilleia linariæfolia, Benth. Tonto Basin (241).
Castilleia affinis, H. & A. Fort Verde (252).
Castilleia integra, Gray. Fort Verde (61).
CASTILLEIA GLORIOSA, *n. sp.* Perennial; calyx nearly equally cleft; stem about one foot high, puberulent, as are the narrowly linear leaves; bracts very large (2 in. long by 1 in. broad, vivid scarlet, obovate-spatulate, obtuse, strongly three-nerved at the base, entire, or with one or two lobes; corolla 1.5–2 in. long, its lip short, three-lobed. Fort Verde (208). Allied to *C. integra,* of which it may possibly be an extraordinarily showy variety.
Orthocarpus purpurascens, Benth., var. *Palmeri,* Gray. Fort Verde (193).

OROBANCHACEÆ.

Aphyllon fasciculatum (Nutt.), Gray. Fort Verde (286); Bloody Basin (332).
Aphyllon Ludovicianum (Nutt.), Gray (?) Bloody Basin (343).

PEDALINEÆ.

Martynia fragrans, Lindl. Fort Verde (215).

VERBENACEÆ.

Verbena bipinnatifida, Nutt. Flagstaff (159).

LABIATÆ.

Monarda fistulosa, L., var. *mollis* (L.), Benth. Mogollon Mts. (86).
Lophanthus urticifolius, Benth. Baker's Butte (118).
AUDIBERTIA MEARNSII, *n. sp.* Inflorescence glomerate, capitate; bracts scarious, reticulated, purplish, the larger broadly ovate, the smaller cuneate ovate, the two lower nearly orbicular and persistent; calyx scarious, about half an inch long,

its four nearly equal lobes minutely ciliate, leaves cinereous, clavate-linear, thick, obtuse, quite entire, about three-quarters of an inch long. Related to *A. capitata.* Fort Verde (246). A curious feature of the species is the prolification of the floral axis in all the specimens examined.

Brunella vulgaris, L. Baker's Butte (105).

PLANTAGINEÆ.

Plantago Patagonica, Jacq. A form. Fort Verde (199).

NYCTAGINEÆ.

Mirabilis multiflora (Torr.), Gray. Fort Verde (176).
Allionia incarnata, L. Fort Verde (216).
Bœrhaavia spicata, Choisy. A variety. Fort Verde (218).
Bœrhaavia lasiolena, Torr. Fort Verde (198).
Oxybaphus angustifolius, Sweet. Baker's Butte (253).

AMARANTACEÆ.

Amarantus Wrightii, Wats. Fort Verde (277).

CHENOPODIACEÆ.

Eurotia lanata (Pursh), Moq. Fort Verde (188).

POLYGONACEÆ.

Eriogonum Abertianum, Torr. Fort Verde (224). Named by Dr. Parry.

Eriogonum microthecum, Nutt. Fort Verde (219).

ERIOGONUM MEARNSII, Parry, *n. sp.* Fruticose, with loose, shreddy bark on the older stems, lanose on the growing shoots; leaves crowded, fasciculate in the axils, usually developing short leafy branches, linear, cuspidate, 5–7 mm. long, revolute to a close cylinder, the smooth upper surface concealing the tomentose under, the base terminating in a short membranous expansion, remaining as a scale after the fall of the leaf; inflorescence terminating the upper branches, sparsely corymbose by simple dichotomous extension; involucre pedunculate, 3 mm. high, segments 5, short, connected by a membranous expansion; perianth conspicuous, bright pink or whitish, with prominent midnerves, tube short, segments broadly spatulate, unguiculate, outer broader and spreading, overlapping the inner; stamens shorter than the perianth lobes, filaments hairy, ciliate; bracteoles plumose, longer than the pedicels; akenes narrowly winged, with long projecting styles; embryo not seen. Fort Verde (179). Though exhibiting some diverse characters, to be included in Section *Corymbosæ*, Benth.

Polygonum Bistorta, L. Mogollon Mts. (84).

POLYGONUM EMERSUM (Michx.), *P. amphibium*, L., var. *emersum*, Michx. Flor. Bor. Amer. i. 240 (1803); *P. coccineum terrestre*, Willd. Enum. 428 (1809); not *P. amphibium*, var. *terrestre*, Willd. Sp. Pl. ii. 443 (1799); *P. amphibium*, var. *Muhlenbergii*, Meisn. in DC. Prodr. xiv. 116 (1856); *P. Muhlenbergii*, Wats. Proc. Amer. Acad. xiv. 295 (1879). *P. terrestre*, B. S. P. in Prel. Cat. Plants N. Y. (1888). Rattlesnake Forks, Mogollon Mts. (93).

RUMEX ARIZONICUS, *n. sp.* Stem smooth, striate, a foot or more high; leaves a foot long, obovate-spatulate, tapering very gradually into the elongated and narrowly margined petiole, the apex abruptly acuminate, slightly scabrous on both surfaces; lower sheaths more than 0.8 in. long, membranaceous; inflorescence spicate in the upper axils, dense; perianth of three smaller outer and three larger inner sepals; stamens six, filaments very short. Fruit not seen. Species probably to be associated with *R. hymenosepalus*, but with very different foliage. Fort Verde (300).

Oxyria digyna (L.), Campd. San Francisco Mts. (33).

LORANTHACEÆ.

Arceuthobium cryptopodum, Engelm. Baker's Butte, on pine (113).

Phoradendron flavescens (Pursh), Nutt. Fort Verde, on cottonwood (164). A variety.

PLATANACEÆ.

Platanus Wrightii, Wats. Beaver Creek (352).

EUPHORBIACEÆ.

Euphorbiaa lbomarginata, T. & G. Near Fort Verde (206).

Euphorbia glyptosperma, Engelm. Fort Verde (155). Named by Dr. C. F. Millspaugh.

Euphorbia Palmeri, Engelm. (?) Western base of San Francisco Mts. (13).

Croton Texensis (Kl.), Muell., Arg. Fort Verde (213).

CUPULIFERÆ.

Quercus undulata, Torr. var. *Wrightii*, Engelm. Tonto Basin (142).

SALICINEÆ.

Salix rostrata, Richards. San Francisco Mts. (3).
Salix nigra, Marsh (?) Fort Verde (302 and 326).
Populus Fremonti, Wats. Fort Verde (174).

GNETACEÆ.

Ephedra Nevadensis, Wats. Copper Cañon (331).

CONIFERÆ.

Juniperus communis, L. San Francisco Mts. (288).
Juniperus Virginiana, L. Near Flagstaff (287).
Juniperus pachyphlæa, Torr. Mogollon Mts. (289).
Pinus monophylla, Torr. & Frem. Mogollon Mts. (285).
PSEUDOTSÚGA TAXIFOLIA (Lamb.),(*Pinus taxifolia,*Lamb.,Gen. Pinus, i. 51 (1803); *P. Douglasii,* Lamb., op. cit. iii. 163; *Pseudotsuga Douglasii,* Carr.). Baker's Butte (351).

ORCHIDEÆ.

Coralorhiza multiflora, Nutt. Baker's Butte (43); San Francisco Mts. (4).
Goodyera Menziesii, Lindl. Baker's Butte (132).
CALYPSO BULBOSA (L.).. *Cypripedium bulbosum,* L. Sp. Plant. 1347 (1753); *Calypso borealis,* Salisb. Parad. Lond. t. 89 (1807).
Epipactis gigantea, Dougl. Fort Verde (168).
Habenaria Thurberi, Gray (?) Weber Creek, Tonto Basin (133).

IRIDEÆ.

Iris Missouriensis, Nutt. Near Flagstaff (156).
Sisyrinchium Arizonicum, Rothr. Baker's Butte (66).
Sisyrinchium bellum, Wats. Baker's Butte (46).

LILIACEÆ.

Unifolium sessilifolium (Nutt.), Greene. Mogollon Mts. (97). Clark's Valley (1).
UNIFOLIUM RACEMOSUM (L.) *Convallaria racemosa,* L.; *Smilacina racemosa,* Desf. Rim Rock, Tonto Basin (134).
Disporum trachycarpum (Wats.), Benth. & Hook. Mormon Dairy Mt. (41 and 69).
Brodiæa capitata, Benth. Fort Verde (301).
Allium mutabile, Michx. Tonto Basin (135).

Calochortus Gunnisoni, Wats. Baker's Butte (108).
Calochortus Nuttallii, T. & G. Fort Verde (203); No. 258 is also, perhaps, this species.
Yucca angustifolia, Pursh. Fort Verde (348).
Yucca baccata, Torr. Fort Verde (337).
Zygadenus elegans, Pursh. Mogollon Mts. (63); Baker's Butte (92).

COMMELINACEÆ.

Tradescantia tuberosa, Greene. Fort Verde (251).
Commelina dianthifolia, DC. Baker's Butte (237).

JUNCACEÆ.

Juncus xiphioides, E. Meyer. Fort Verde (227).
Luzula spadicea, DC. San Francisco Mts. (8).

CYPERACEÆ.

Cyperus speciosus, Vahl. Fort Verde (228).
Eleocharis palustris (L.), R. Br. Fort Verde (265).

GRAMINEÆ.

Panicum Crus-Galli, L. Fort Verde (264).
Phleum alpinum, L. Mogollon Mts. (55).
Eremochloë Kingii, Wats. Fort Verde (210).
Poa Californica, Vasey. East base of San Francisco Mts. (9). Named by Dr. Vasey.
Poa —— (?) San Francisco Mts. (10).
Elymus Sitanion, Schultes. Fort Verde (318).

FILICES.

Polypodium vulgare, L. Baker's Butte (78); Rim Rock, Tonto Basin (109).
Pteris aquilina, L. Baker's Butte (45).
Adiantum Capillus Veneris, L. Fossil Creek (281).
Pellœa atropurpurea (L.), Link. Mogollon Mts. (121).
Pellœa Wrightiana, Hook. Mogollon Mts. (67); Sycamore Creek (344).
Cheilanthes Fendleri, Hook. East of Fort Verde (284).
Asplenium Trichomanes, L. Tonto Basin (110).
Aspidium Filix-mas, L. Cañon of Clear Creek, fifty miles from its confluence with the Rio Verde (127).
Woodsia Mexicana, Fee. Baker's Butte (120).

EQUISETEÆ.

Equisetum robustum, A. Br. Fossil Creek (250).
Equisetum palustre, L. Clark's Valley (125).

MUSCI.

Hypnum rusciforme, Weis. Fossil Creek (282, 283).

GASTEROMYCETES.

Lycoperdon atropurpureum, Vitt. Named by Mr. Chas. H. Peck. Mogollon Mts. (37).

GENERAL FLORAL FEATURES OF THE SAN FRANCISCO AND MOGOLLON MTS. OF ARIZONA AND NEW MEXICO, AND THEIR ADJACENT REGIONS.

BY H. H. RUSBY, M.D.

The territory here considered comprises three distinct regions—an elevated, open, somewhat barren table-land; a still more elevated heavy forest belt, and a low, desert, mostly sandy plain.

The first comprises the northern and north-eastern portions, and is the continuation of the high plateaus of New Mexico and Utah. It is traversed by a number of profound canyons, with precipitous walls a mile or more in height, and by many others of less depth. It supports some isolated ridges and peaks besides the second region above-named. Upon them occurs some good-sized timber, including trees like *Pinus ponderosa,* Dougl.; *P. edulis,* Eng.; *Juniperus occidentalis,* Hook.; var. *monosperma,* Eng.; *J. pachyphlœa,* Torr.; *Fraxinus pistaciæfolia,* Torr., and *Quercus* of several species; the largest and most important being *Q. undulata,* var. *Gambelii,* Eng., and *Q. oblongifolia,* Torr. Occasionally we see a tree of *Juglans rupestris,* Eng. Among the smaller trees and shrubs, the most conspicuous are *Morus microphylla,* Buckley; *Cercocarpus parvifolius,* Nutt.; *Forestiera Neo-Mexicana,* Gray; *Garrya Fremontii,* Torr.; *Ribes aureum,* Pursh; *Arctostophylos pungens,* H. B. K., and a number of small oaks, notably *Q. grisea,* Liebm., and *Q. hypoleuca,* Eng. These elevated portions, with some river-bottoms, where we often find cotton-woods and sycamores and the gigantic *Alnus oblongifolia,* Torr., constitute about the whole of the forest area of this division. The entire level portion of the plateau is destitute of everything larger than shrubbery, characteristic among which may be mentioned the Yuccas, chiefly *Y. baccata,* Torr., and *Y. angustifolia,* Pursh, Artemisias and Ephedras. The alkaline flats are densely covered with a half-shrubby growth—through which travel is nearly impossible—of *Dicorea Brandegei,* Gray; *Oxytænia acerosa,* Nutt., and many species of Atriplex and other Chenopodiaceous and Amarantaceous plants. Upon the sides of some of the canyons occurs an extensive growth of shrubs, but these spots for the most part are exceedingly dry and barren, reflecting back the sunshine from their bare rocks, and maintaining a temperature most trying to the endurance of the collector. Upon these plains there has once been an extensive forest growth, as indicated by the petrifactions that occur. Some of these silicified trunks are of great size. One that I found near Holbrook measured eleven feet from a point just beyond the centre on one side to the periphery upon the other. The remaining portion had separated and fallen down the hillside.

The table-land is a never-ceasing source of surprises to us from the East. During the greater part of the year the surface is dry and desolate, of an ashy gray color; but immediately upon the occurrence of the annual rains it changes with marvellous rapidity. Within three days after the first important showers, a distinct tinge of green is perceptible. In a week the surface is of an almost uniform light green, and in from ten days to two weeks it presents an appearance of great luxuriance. From this time on, until the occurrence of killing frosts, it is a paradise for the collector. Among the earliest plants to mature are those which spring from bulbs, including several beautiful species of Allium and Calochortus, and a Brodiæa or two. Among grasses, Boutelouas and Aristidas are most abundant over the general surface, with Poas, *Agrostis verticillata,* Vill., *Ammophila longifolia,* Benth., and *Setaria caudata,* R. and S., in the low and sandy places. Among these grasses other plants grow, not scattered and intermingled as in the East, but each species occupying a larger or smaller area almost independently. Thus we find patches of golden Pectis, Gutierrezia, Viguiera, Verbesina, Hymenatherum, and Hymenopappus, showy purple Astragali and brilliant many-colored Pentstemons and scarlet Castilleias. In the slightly elevated, broken ground, where the growth of the grasses is disturbed, abounds the Argemone, showy species of Œnothera, Sidas, Malvastrums, and Sphæralceas. One or more species of Eriogonum will be found everywhere. *E. annuum,* Nutt., and *E. Wrightii,* Torr., with the larger form of *E. Abertianum,* Torr., seek the rocky places, while *E. cernuum,* Nutt., and *E. racemosum,* Nutt., prefer the grassy plains, and *E. trichopodum,* Torr., *E. vimineum,* Dougl., and the dwarf form of *E. Abertianum,* Torr., grow almost exclusively in the sand. Certain plants like Rumex, *Bahia* *oppositifolia*, T. and G., *Actinella odorata*, Gray, *Dysodia chrysanthemoides*, Lag., *D. Cooperi*, Gray, *Schkuhria Hopkirkii*, and the *Hoffmannseggias*, are almost characteristic of the water-holes, the low places where the rains settle.

This first section extends from the eastern nearly to the western boundary of the territory along its northern border. Its western limit extends diagonally, curving toward the north-east, from the north-western to the south-eastern corner of the territory, dividing it approximately into halves. In its north central point the second region takes its rise, running to the verge of the plateau near Fort Verde, and thence skirting it to the south-eastward and into New Mexico. This belt, known as the San Francisco Forest, consists almost wholly of the *Pinus ponderosa*. It is one of the most beautiful forests in existence, its effect heightened by contrast with the neighboring deserts, from which it must be entered. The same conditions of isolation render it one of the most important of timber resources. The San Francisco Mts., in which this forest takes its rise, have an elevation of about 9,000 ft., and rise some 2,500 or 3,000 ft. above the general level. Their volcanic origin is strikingly apparent. To the eastward they present formidable gulfs and precipices, but to the westward a comparatively easy ascent. At the summit grow only lichens. One or two hundred feet below begins the alpine flora, represented in flower at the time I visited them, July 3d, 1883, by *Cerastiums*, *Sedum rhodantheum*, Gray, *Arenaria scabrella*, Greene, which I collected for the first time; *Polemonium confertum*, Gray; *Luzula spadicea*, DC., var. *parviflora*, and the most beautiful *Primula Parryi*, Gray. This species presented patches of radiant bloom upon the surface of the snow, which had covered its roots to the depth of several inches. *Pedicularis Parryi*, Gray, was abundant a little lower, and at about 8,000 ft. occurs the timber-line. The upper timber consists mostly of firs and spruces, notably the *Pseudotsuga Douglàsii*, Cav., with *Pinus aristata*, Eng.; the *Pinus ponderosa* of the forest proper beginning at about 7,000 ft. In the ravines of the upper portion of the forest we collect *Potentilla Thurberi*, Gray, *Mertensia paniculata*, Don., *Pentstemon glaucus*, Graham, var. *stenophyllus*, Gray, *Thalictrum Wrightii*, Gray, *Ligusticum scopulorum*, Gray, *Hieracium Fendleri*, Gray, *Frasera speciosa*, Dougl., *Habenaria Thurberi*, Gray, and a gooseberry, probably *R. lacustre*, Poir. Toward the bottom there is abundance of *Zigadenus elegans*, Pursh, *Erigeron glabellus*, Nutt., and, if I remember correctly, *Aster adscendens*, Lindl. Crossing the slope at the base, we walk nearly waist-deep in fine pasture grasses, chiefly of the long- and short-leaved varieties of *Festuca ovina*, L., to me appearing specifically distinct. *Poas* and *Sporobolus* are also abundant, and it was here, I think, that I collected *Agropyrum Scribneri*, Vasey. *Oxytropus Lamberti*, Pursh, one of the "Loco-weeds," is much too abundant among these pastures. Two very handsome forms of *Senecio Fendleri*, Gray, grow in dense tufts, a foot in diameter and one to two feet high. In the same manner grow *Euphorbia Pringlei*, Eng., and *E. campestris*, Ch. and Sch. A little swamp-land near the mountain is filled with *Salix rostrata*, Rich. The herbage is closely cropped by the sheep, but we collect *Ranunculus Hookeri*, Regel (*R. cardiophyllus*), *Claytonia perfoliata*, Don., and *Geranium cæspitosum*, James. Near the base of the mountain is a ranche, the door-yard filled with a luxuriant growth of *Aster foliaceus*, var. *Burkei*, Gray—a rich and beautiful aster, growing in large, loose clumps, with ascending stems a foot or eighteen inches high. A mound of scoria in the distance presents a golden surface of *Helenium Hoopesii*, Gray.

This exceedingly meagre outline of the flora of the San Francisco Mts. will apply generally to similar peaks scattered through this forest. On Bill Williams' Mountain, however, situated some fifty miles to the south-west, I collected quite a number of additional species of interest. Among them were *Heuchera rubescens*, Torr.; *Pentstemon Bridgesii*, Gray, *Berberis repens*, Lindl., *Potentilla rivalis*, Nutt., var. *millegrana*, Wats., *Mimulus floribundus*, Dougl., *Taraxacum*, *Aster pauciflorus*, Nutt., *Polygonum Bistorta*, L., *Smilacina sessilifolia*, Nutt., *Disporum trachycarpum*, several Trifoliums and a Cimicifuga in flower only, perhaps our *C. racemosa*, Nutt.

Besides its mountain flora, the forest region has a distinct class of plants characteristic of the dry, stony knolls, 100 to 150 ft. high, which abound there. Of such plants I collected *Erigeron flagellaris*, Gray, several species of *Muhlenbergia*, *Mentzelia lævicaulis*, T. and G. (?), *Sphæralcea Emoryi*, Torr., and a species which has been referred to *Stephanomeria Wrightii*, Gray, but which I am persuaded is distinct from that species. *S. Wrightii* is characterized by great brittleness, with a weak, soft root, while the specimens here referred to possessed stems almost as tough as those of the flax, and long, tough, and hard roots.

The timber, though heavy over the level portion, is not dense, and the sharply stony surface is lightly and thinly carpeted with forest grasses, chiefly *Sporobolus* of several species, with quantities of *Muhlenbergia Wrightii*, Vasey, here and there. Everywhere thickly sprinkled among the grasses are numerous flowering species. Perhaps the most abundant plant throughout this region is *Pentstemon linarioides*, Gray, which displays a great variety of forms. Other of the most characteristic species are *Oxalis decaphylla*, H. B. K., *Astragalus Arizonicus*, Gray, *A. Greenei*, Gray, *A. Rusbyi*, Greene, with rarely a specimen of *A. Matthewsii*, Wats.—a species belonging more properly to the open country; *Potentilla subviscosa*, Greene, *Carum Gairdneri*, *Ligusticum montanum*, *Aplopappus croceus*, Gray, *Troximon glaucum*, Nutt., *Senecio Arizonicus*, Greene, *S. Actinella*, Greene, *Actinella Bigelovii*, Gray, *A. scaposa*, Nutt., and *Solidago nana*, Nutt.; early in the season the ground is aflame with the beautiful *Phlox speciosa*, Pursh, var. *Woodhousei*, Gray.

Everywhere through the forest we encounter beautiful open parks, from a few acres to several square miles in area. Here the grasses are taller, often nearly two yards high, and of different species. *Stipa pennata*, L., var. *Neo-Mexicana*, Thurb., and *S. comata*, Trin., are conspicuous. Other plants which constantly occur in such locations are *Senecio Douglassii*, DC., *Aster tanacetifolius*, H. B. K., *A. canescens*, Pursh, *Hymenopappus Mexicanus*, Gray, *Actinella Rusbyi*, Gray, the beautiful *Gilia multiflora*, Nutt., *Eriogonum cernuum*, Nutt., *Astragalus Hosackiæ*, Greene, and many *Eritrichiums* of the *Jamesii*, *glomeratum* and *setosissimum* type. It is usually, or at least very commonly, in these parks that the permanent water-supplies are to be found. The soil underlying the forest consists, for the most part, to a great depth, of loose volcanic rock, upon the surface of which no stream can form a permanent bed. The water-courses, therefore, are far beneath the surface, but reappear occasionally to form living pools of delicious water, often a hundred yards or more in diameter. About these springs are found characteristic species, sedges and rushes, *Iris Missouriensis*, Nutt., *Epilobium paniculatum*, Nutt., *Campanula Scheuchzerii*, Vill, and the like.

During the heavy rains, even this porous soil is not sufficient to absorb the entire fall of water, and it runs off through the hollows, very readily washing out the loose material to form ravines and small canyons of the very roughest class. Up along these canyons creep many of the lowland plants, and down them escape many of those of the highland, producing a richly varied and characteristic flora. *Cnicus* of several species, *Lactuca pulchella*, DC., a peculiar form of *Verbena polystachya*, H. B. K. (?), *Synthyris plantaginea*, Benth., *Hedeoma procumbens*, Greene, a beautiful little species, *Senecio Rusbyi*, Greene, *Pentstemon Palmeri*, Gray, *Prunus demissa*, Walp., *Spiræa millefolium*, Torr., and *S. discolor*, Benth., *Cowania Mexicana*, D. Don, *Ribes cereum*, Dougl., *Fendlera rupicola*, Eng., *Sambucus glaucus*, Nutt., *Lonicera involucrata*, Banks, *Lupinus rivularis*, Dougl., var. *latifolius*, Wats., *Ivesia depauperata*, Gray, *Galium Wrightii*, Gray, and *G. microphyl-*

lum, Gray, *Helianthus Maximiliani,* Schrader, and *Parietaria debilis,* Forst., are among the most characteristic of this diverse flora. Of these, the last six may be mentioned as becoming more common as we descend, and being really plants of the lower districts. Upon the rocky margins of these canyons, in localities especially exposed to the sweeping storms, occurs the peculiar *Spiræa cæspitosa,* Nutt.—a stout shrub, with stem often an inch and a half in diameter, yet its uppermost portions are rarely more than an inch and a half above the rocks on which it lies closely prostrate. In its company are usually some shrubby Eriogonums, notably *E. deflexum,* Torr., *E. microthecum,* Nutt., and *E. flavum,* Nutt.

Continuing our descent of such a canyon until it emerges from the forest, there is an open, but usually grassy plain of greater or less width to traverse, and we stand upon the jagged edge of the plateaus, and gaze into some basin from one to two thousand feet deep, and out across the desert plains which constitute the third region of which I have spoken. At nearly all points upon the edge of this plateau, we find such an abrupt descent. Its passage is rendered still more laborious by the dense tangle of scrub oaks which cover it towards the summit. A consideration of the interesting flora of this lower region forms no part of the present paper.

On the explorations conducted in this forest in 1883, I was accompanied by Mr. Randall Spaulding, to whose exceptional skill in photography we are indebted for the series of views with which my paper has been illustrated, and by Mr. Charles M. Davis and my brother, Mr. Wm. S. Rusby. Through their keen eyesight my list has been enriched with many of its species.

The subject was further discussed by the PRESIDENT, who referred to his own travels in the same region some years before. He described a severe snow-storm on the table-land, with a fall of eight inches in depth, gave reminiscences of bear-hunting in the forests, and alluded to the cliff dwellings in the San Juan valley, and the remarkable and interesting scenery produced by the abundant growth, in many of the valleys, of yuccas, cacti, and century-plants.

Prof. W. G. Farlow. Compliments of E. G. Britton

CONTRIBUTIONS FROM THE HERBARIA OF
COLUMBIA COLLEGE.—No. 10.

Contributions to American Bryology—I.

An Enumeration of Mosses collected by MR. JOHN B. LEIBERG,
in Kootanai Co., Idaho.

BY ELIZABETH G. BRITTON.

(Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. XVI., No. 4.)

W. G. FARLOW.

Contributions to American Bryology.—I.

By Elizabeth G. Britton.

AN ENUMERATION OF MOSSES COLLECTED BY Mr. JOHN B. LEIBERG, IN KOOTENAI CO., IDAHO.*

(Plate XCI).

Sphagnum squarrosum, Pers. North Fork Basin, Lake Cœur d'Alene (84).

Sphagnum teres, Angstr. Lake Pend d'Oreille (45).

Mollia æruginosa (Smith), Lindb. (*Gymnostomum rupestre*, Schwægr). In spray of waterfall, Lake Pend d'Oreille (45).

Dichodontium pellucidum (L.), Schimp. North Fork Basin, Lake Cœur d'Alene (80).

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*Where no locality is given, the vicinity of Lake Pend d'Oreille is to be understood.

Anisothecium Grevillei (Br. & Sch.) Lindb. (*Dicranella Grevilleana*, Schimp). Springy places, Lake Pend d'Oreille, (44).

Dicranum scoparium (L.), Hedw. (42 and 47).

Dicranum fuscescens, Turn. Same locality (15).

Dicranum strictum, Schleich. On decaying logs, same locality (22).

Fissidens rufulus, Br. & Sch. (*F. ventricosus*, Lesq). Sterile on submerged rocks, same locality (61 in part).

Fissidens grandifrons, Brid. Granite ledges in swift mountain streams, sterile (63).

Fissidens bryoides, Hedw. North Fork Basin, Lake Cœur d'Alene (68 and 91).

Conomitrium Hallianum, Sull. & Lesq. On rocks at low-water line, Lake Pend d'Oreille, sterile (120).

Ceratodon purpureus (L.), Brid. (139).

Swartzia montana (Lamk.), Lindb. (*Distichium capillaceum*, Br. & Sch). North Fork Basin, Lake Cœur d'Alene (124).

Tortula pusilla (Hedw.) Mitt. (*Pottia cavifolia*, Ehrh.) Mixed with *Bryum argenteum*, var. *lanatum* (32).

Tortula princeps, De Not. (*Barbula Muelleri*, Br. & Sch.) (145).

Barbula unguiculata (Huds.) Hedw. One of the forms. (48).

Barbula subfallax, Muell. ? On decaying logs (52 and 96); around waterfalls (95).

Scouleria aquatica, Hook. (*Grimmia Scouleri*, Muell.) With *Fissidens rufulus*, on submerged rocks sterile (61 in part).

Leersia extinctoria (L.), Leyss., var. *obtusifolia* (Funck), Braithw. (*Encalypta vulgaris*, Hedw. var. *obtusa*, Schimp.) Alpine regions, on the ground (33).

Leersia rhabdocarpa (Schwægr.), Lindb. (*Encalypta rhabdocarpa*, Schwægr.) (153).

Leersia laciniata, Hedw. (*E. ciliata*, Hedw.) Mixed with small form of *Bartramia pomiformis* (153 in part).

Grimmia apocarpa (L.), Hedw. var. *gracilis* (Schleich.), Web. & Mohr (4).

Grimmia anodon, Br. & Sch. (31).

Grimmia torquata, Hornsch. (Plate XCI.) Fertile, on granite ledges about Lake Pend d'Oreille (20). Plants compared with Drummond's No. 58, Macoun's No. 91, and European specimens. Basal areolation of the leaves less quadrate and more sinuous than figured by Dr. Braithwaite (British Moss Flora, ii. t. xlvii. E), but a specimen collected by him agrees with American specimens (see figs a, b, 4 and 5). Capsule exserted on a slender, curved pedicel, 3 to 5 mm. long, erect and twisted when dry, less than 1 mm. long, prolate-spheroidal when young, cylindrical and ridged when old and brown; operculum with a long, straight beak, just covered with the brownish, mitrate calyptra; annulus none, peristome also lacking on the only specimen which still retained the operculum; perichætial leaves three, longer and stouter than the stem-leaves, with a short hyaline, serrulate point, twisted around the base of the pedicel when dry, erect-patent when moist.

Closely resembling *G. trichophylla*, Grev., but capsule smaller on a pedicel longer in proportion to its size, more closely twisted when dry; teeth not present on any of the old capsules. Dr. Braithwaithe says, "short jointed filaments producing globose propagula at upper end, are frequent upon the leaves (l. c. 15, f. 10) these do not seem to be at all abundant upon American specimens, but appear rather as short, bifurcating, irregular filaments, than as moniliform hairs.

Grimmia pulvinata (L), Smith. Mixed with *G. trichophylla* (147 in part).

Grimmia pulvinata, var. *obtusa* (Brid.), Huebn. (3 in part).

Grimmia trichophylla, Grev. (3 in part, 147 in part).

Grimmia Donii, Smith. Spokane Falls, Washington (110).

Grimmia montana, Br. & Sch. Granite ledges (53).

Grimmia ovata, Web. & Mohr. (*G. commutata*, Huebn.), Lesq. & James, Manual, 145). (17).

Grimmia ovalis (Hedw.), Lindb. *G. ovata*, Lesq. & James, l. c. 143 not Web. & Mohr). (13).

Grimmia microcarpa (Gmel.), Lindb. *Rhacomitrium Sudeticum*, Br. & Sch. On gneissoid rocks, west of Lake Pend d'Oreille. (102 in part).

Grimmia heterosticha (Hedw.), C. Muell. (*R. heterostichum*, Brid.) (123).

Grimmia patens (Dicks.), Br. & Sch. (*R. patens*, Huebn., North Fork Basin, Lake Cœur d'Alene, mixed with 102). (127).

Grimmia acicularis (L.), C. Muell. *R. aciculare*, Brid.) In short, brownish-green, compact tufts, like Macoun's specimens from Yale, B. C. (19); also in loose, long, blackish-green bunches on gneissoid rocks, west of Lake Pend d'Oreille, mixed with *G. microcarpa.* (102 in part).

Coscinodon cribrosus (Hedw.), Spruce. (*C. pulvinatus*, Spreng.) ? Teeth nearly entire on the only capsule found (35).

Weissia Americana, Lindb. (*Ulota Hutchinsiæ*, Schimp.) (11).

Orthotrichum Lævigatum, Zett. ? (8).

Orthotrichum Texanum, Sull. Ledges, Lake Cœur d'Alene (133 in part); Lake Pend d'Oreille (60).

Orthotrichum rupestre, Schleich. Ledges, Lake Cœur d'Alene (134 in part); Lake Pend d'Oreille (37).

Orthotrichum affine, Schrad. On trees in woods (7, 11, 40 and 123 in part).

Orthotrichum alpestre, Hornsch. On trees (10).

Orthotrichum speciosum, Nees. On trees (152).

O. elegans, Schwægr., seems worthy of distinction, as Drummond's No. 155, and Mr. Leiberg's 9 and 152 in part are bright and green, with stems ferruginously tomentose, leaves more spreading, and other differences, for which see Venturi, Musc. Gall. 169, t. 46.

Orthotrichum fallax, Schimp. (159).

Orthotrichum obtusifolium, Schrad. On poplar trees, North Fork Basin (101). Specimens agree with Bryol. Europ. t. 208, and Lesq. and James Man. 177, but not with Venturi, Musc. Gall. 193, t. LII., but rather with *O. Rogeri*, Brid., Venturi, l. c. 186, t. 51.

Hedwigia ciliata, Ehrh. "Not common" (36).

Braunia Californica, Lesq. "Rather local" (103).

Anœctangium Lapponicum, Hedw. (*Amphoridium Lapponicum*, Schimp.) Precipices of the Chilco Range, south end of Lake Pend d'Orielle (89).

Anœctangium Mougeotii (Bruch.), Lindb. (*A. Mougeotii*, Schimp.) (76).

Ptychomitrium Gardneri, Lesq. (11 in part).

Funaria hygrometrica (L.), Sibth. North Fork Basin, Lake Cœur d'Alene (90); also a small set of plants too old for certain determination, alpine regions (34).

Bartramia pomiformis (L.), Hedw. var. *crispa*, Schimp. (112). Also dwarf form of the species, agreeing with Labrador specimens collected by O. D. Allen (53 in part).

Philonotis fontana (L.), Brid. (35).

Philonotis calcarea, Schimp. ? ? "In a calcareous spring, very rare" (49). Capsules too old for certain determination; may be *P. fontana*, var.

Pohlia nutans (Schreb.), Lindb. (*Webera nutans*, Hedw.) (74 mixed with 140).

Pohlia cruda (L.), Lindb. (*W. cruda*, Schimp.) North Fork Basin (136).

Leptobryum pyriforme (L.), Wils, (150).

Bryum argenteum, L., var. *lanatum* Br. & Sch. Alpine regions (32 in part).

Bryum cæspiticium, L. Mixed with *Pohlia nutans* (140).

Astrophyllum medium (Br. & Sch), Lindb. (*Mnium medium*, Br. & Sch.) North Fork Basin. (92).

Astrophyllum cuspidatum (L.), Lindb. (*M. affine*, Bland). (93). Also from North Fork Basin (94).

ASTROPHYLLUM SPINULOSUM (Br. & Sch.) (*M. spinulosum*, Br. & Sch.) (2).

Leucolepis acanthoneura (Schwægr.), Lindb. (*Mnium Menziesii*, C. Muell). (98).

Mnium androgynum, L. (*Aulacomnion androgynum*, Schwægr.) (43 mixed with 96).

Timmia Austriaca, Hedw. On rocks and earth (99 and 113).

CATHARINEA SELWYNI (Aust.) (*Atrichum Selwyni*, Aust. Bot. Gazette, ii. 95.) (21).

Polytrichum alpinum, L. (*Pogonatum alpinum*, Roehl). (142).

Polytrichum piliferum, Schreb. (110).

Polytrichum juniperinum, Willd. (115).

Buxbaumia aphylla, L. Decaying logs, Traille River basin, (not numbered).

Fontinalis antipyretica, L. "In mountain streams, fruiting abundantly." (114).

Fontinalis Lescurii, Sulliv. Granite Ledges in Lake Pend d'Oreille (137).

Dichelyma uncinata, Mitt.? Decaying logs, bushes and twigs, North Fork Basin (81). Sent to Kew for comparison with the type; perichætial leaves are twisted!

Neckera Menziesii, Drummond. Granite ledges, fruiting abundantly with flagelliform branches (121). On trees and rocks at and below water-line, sterile (82).

Neckera Douglasii, Hook. On trees, sterile (83).

Antitrichia Californica, Sulliv. Granite ledges (18).

Climacium Americanum, Brid. Sterile (51).

Hypnum pseudo-sericeum, C. Muell. (29 in part).

Hypnum crispifolium, Hook. Along rivulets. (69); on the ground in woods (5).

Hypnum (*Camptothecium*) *lutescens*, Huds. (56 and 29 in part).

Hypnum æneum, Mitt. Typical (28).

Hypnum Nuttallii, Wils. (27 and 58).

Hypnum megaptilum, Sulliv. On the ground in damp woods, finer and more branching specimens than the type. (41).

Hypnum Stokesii, Turn. (65 and 69 in part).

HYPNUM (THAMNIUM) LEIBERGII, n. sp. North Fork Basin, Lake Cœur d'Alene, on quartzite ledges (78).

Diœcious; perichætial leaves ecostate with recurved apices, entire, or slightly serrulate; leaves costate to just below the apex, entire, or slightly serrulate below, coarsely serrate above; pedicel 1 cm. long, falling off with the capsules when old; inner peristome with three appendiculate regular cilia as long as the teeth, or occasionally irregularly united into one or two, and scarcely appendiculate.

Between *H. Alleghaniense*, Muell. and *H. neckeroides*, Hook, differing from the former in the diœcious inflorescence and from the latter in the length of the cilia. Mr. Wright has kindly compared specimens sent him with the type of *H. neckeroides* at Kew, and confirms the above diagnosis.

Hypnum loreum, L. (84). Lake Cœur d'Alene.

Hypnum triquetrum, L. (97).

Hypnum splendens, Hedw. (100).

Hypnum uncinatum, Hedw. var. *plumosum*, Schimp. (131).

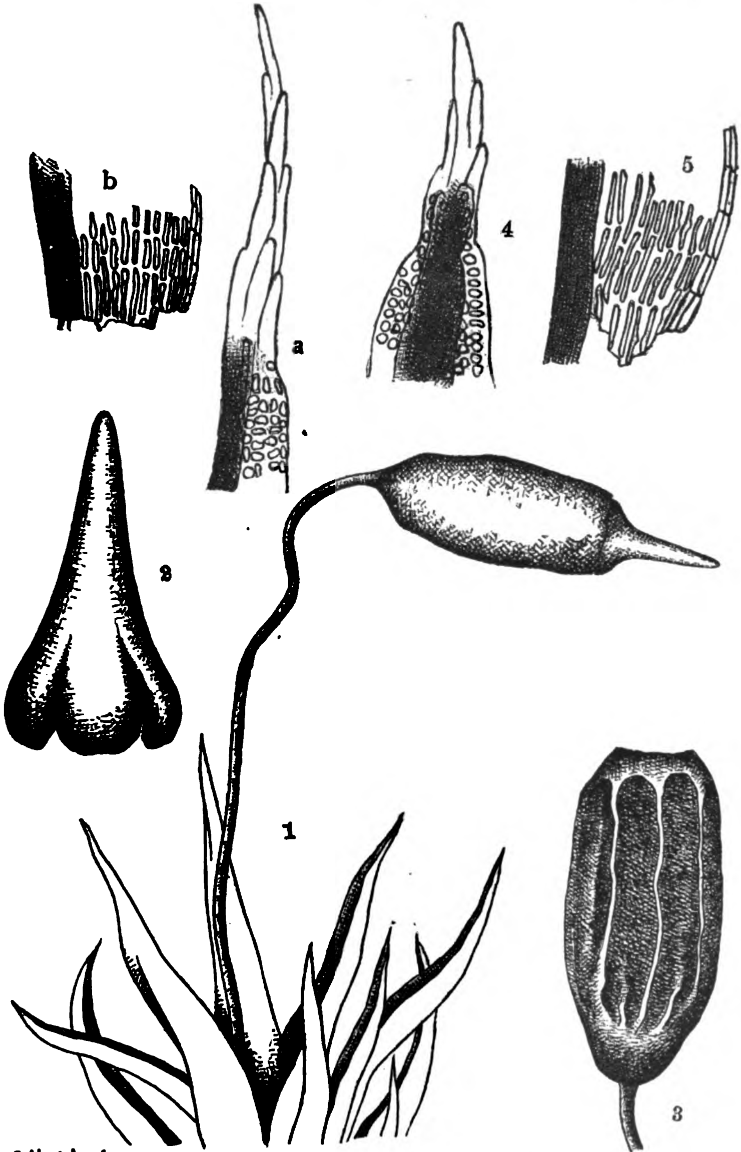
Hypnum robustum, Hook. Cañons and valleys in the Traille River Basin (not numbered).

Hypnum subimponens, Lesq. (129).
Hypnum aduncum, Hedw. var. *giganteum*, Br. & Sch. (88).

Description of Plate XCI.

Figs. 1-5, drawn from J. B. Leiberg's specimens.
Figs. a and b, drawn from Dr. Braithwaite's specimen.
Figs. a and 4, hyaline toothed apices of the leaves.
Figs. b and 5, elongated basal cells.
Fig. 3, Old, ridged capsule.

Bulletin of the Torrey Botanical Club. Plate XCI.



a.H. del. ad nat.

Grimmia torquata, Hornsch.

CONTRIBUTIONS FROM THE HERBARIUM OF COLUMBIA COLLEGE.—No. 11.

Preliminary Note on the North American Species of the Genus Tissa, Adans.

BY N. L. BRITTON.

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Preliminary Note on the North American Species of the Genus Tissa, Adans.

By N. L. Britton.

Botanists have had great difficulty in limiting the species of Sand Spurrey. There is, indeed, perhaps no other genus of flowering plants concerning whose specific composition more widely diverse views have been propounded. Thus we find Mr. Bentham in 1862 (Genera Plantarum, i. 152) regarding the species as "3 vel 4," while N. C. Kindberg's elaborate Monograph of the following year (Nova Acta Reg. Soc. Sci. Upsal. (III.) vii. fasc. i.) contains descriptions and figures of not less than 25. Durand's recent "Index Generum Phanerogamorum" repeats the Benthamian view, which Baillon also apparently defends (Histoire des Plantes, ix. 116) saying "species ad 3." This last is the latest expression we have had on the subject, published indeed, during the past year, and we may now look with much interest for the dictum of the distinguished authors of "Die Naturliche Pflanzenfamilien" which has not as yet treated of the Carophylleæ.

So far as North American botanists have been concerned with their native plants, there has not been much difference of opinion expressed—however much may have otherwise existed—for the species have never yet been systematically brought together. The Eastern Manuals have recognized three species; the Botany of California describes two (one of them also eastern), four new species have recently been named, another (if my supposition is correct) frequent in the alkaline area of the Andes, extends to Southern California, and still another, abundant in the Mediterranean region, is found in our Western and Southern States. I have not ventured to unite any of these species, nor to describe any more, although there are plenty of indications from the herbaria that other forms, species or varieties will sooner or later claim recognition. I have thus recognized ten species, all but one of which occur within the United States. The apparently great divergence from the views of the eminent English and French authors above mentioned is readily explicable by stating that the material on which the additional five or six species I have been able to recognize is based, is quite new, and none of them have been studied by either Bentham or Baillon. It is to Professor Greene that I am indebted for much of the material which has thrown most light on the Pacific Coast forms, and he informs me that he has evidence of the existence of other forms, specimens of which in satisfactory amount and condition for critical study are not yet available. So far as the twenty-five species recognized by Kindberg are concerned, I am entirely satisfied that they are mainly artificial, and actually represent not many more than the three or four of Bentham or Baillon.

It is hardly necessary that I should discuss the generic name of these plants; Professor Greene has very recently alluded to it in "Pittonia," and M. Baillon has adopted it in his "Histoire." Suffice it to say that there is no valid choice in the matter, for 1763, the date of Adanson's "Familles des Plantes," is fifty-four years before the publication of *Lepigonum*, and a little more than that earlier than *Spergularia*. There is no doubt whatever as to what Adanson meant, and hence it becomes a matter of mere priority of publication, for which fifty-four years will be considered ample, I believe, by even the most conservative. Adanson considered that the species known at his time formed two genera, and called the other one *Buda*, under which species have been named by DuMortier in his "Florula Belgica;" this view has not been accepted by any recent botanist, and as *Tissa* occurs first in Adanson's work, it has priority of place and must stand as the generic appellation of these interesting plants.

Through the courtesy of Mr. Redfield and Dr. Watson I have been able to make quite careful examinations of the materials in the Cambridge and Philadelphia herbaria.

(A) ANNUALS; ROOTS FIBROUS.

* Species of the sea-beaches or salt-marshes or of the borders of salt lakes; leaves very fleshy; stamens (always? 10;) petals pink, (varying to white?).

1. TISSA MARINA (L.) (*Arenaria rubra*, L., var. *marina*, L., Sp. Pl. 606 (1753); including *Lepigonum marinum*, Kindb.

Monog. 18, at least in so far as the North American plants are concerned, *Lepigonum medium*, Fries and *L. leiospermum*, Kindb. l. c. 23).

Stout, erect or ascending, smooth or glandular-pubescent; capsule 5–8 mm. long at maturity; pedicels short (seldom more than twice this length); seeds smooth, margined or marginless, or roughened with projecting points or processes, several kinds sometimes found within the same capsule; leaves often much clustered in the axils.

Hab. Along the whole coast on both sides of the continent, apparently less abundant on the Gulf of Mexico; also about saline lakes and on alkaline soil in the interior.

2. TISSA SALINA (Presl.) (*Spergularia salina*, Presl. Fl. Cech. 93 (1819,) *fide* Kindberg.

Slender and spreading, low, abundantly branching, generally diffuse, and apparently always so in its fully developed state, entirely smooth; pedicels long, slender, more than twice the length of the capsule, which is 4-6 mm. long at maturity and twice the length of the calyx; leaves generally simply opposite; seeds papillose or smooth.

Hab. In the sand or mud of sea-beaches, more rarely (if at all) on the meadows, coast of New England and Canada. Not seen from further south than Eastport (Farlow) or South Gouldsboro (Redfield).

This is an extremely well marked species, as I understand it, and I have little doubt that it is the same thing that occurs on the shores of northern Europe, although comparison with more European specimens is very desirable. This restricts its range much within the limits assigned by Kindberg, who by going mainly upon the seeds has included in this, as in other species, a large number of diverse elements. Certainly in these two species the seed characters are of but little value.

* * Species of non-saline distribution.

† Petals pink.

3. TISSA RUBRA (L.) (*Arenaria rubra*, L. l. c.; *Spergularia rubra*, Presl; *Lepigonum rubrum*, Fries).

Depressed, spreading or ascending, very leafy to the flowers; stipules ovate-lanceolate, acuminate; plants smooth or but slightly pubescent.

Hab. In dry, especially sandy soil along both the Atlantic and Pacific coasts, not seen west of the Alleghanies nor east of California, and generally appearing as if introduced. Indeed I have not met with evidence that it is really indigenous in East America, and from its being so common a weed in Europe, our plant may very likely be of exotic origin.

4. TISSA DIANDRA (Guss.) (*Arenaria diandra*, Guss. Fl. Sic. Prodr. 1, 515 (1827); *Arenaria salsuginea*, Bunge in Ledeb. Fl. Alt. ii. 163 (1829); *Lepigonum salsugineum*, Kindb. l. c 42 and Syn. 7).

Spreading or bushy branched from the base; stipules ovate, acute; peduncles leafless or nearly so; plant glandular pubescent.

Hab. Galveston, Texas (Lindheimer); Rio Brazos, Texas (Drummond, 97 in Herb. Gray.); Sierra Valley, Cal. (Lemmon, 1874, doubtfully referred to this species); sandy bank of the Columbia River, W. Klickatat Co., Washington (Suksdorf, 176); also collected by Mr. Henderson in the same region in 1885. Our plant agrees very nearly with authentic specimens from Arabia. Its specific separation from *T. rubra* is open to question.

† † Petals none.

5. TISSA GRACILIS (S. Wats.) (*Lepigonum gracile*, S. Wats. Proc. Amer. Acad. xvii. 367 (1882).

Capsules 2-4 mm. long, slightly exceeding the calyx; seeds tuberculate; plants small and delicate, 4-8 cm. high.

Hab. Los Angeles, Cal. (Parry, No. 15, 1881); Otay, San Diego Co. (Orcutt, 1201); wet sands near Dallas, Texas (Reverchon in Curtiss, No. 333* distributed as *S. Mexicana*, Hemsl.)

6. TISSA TENUIS, Greene in litt. (*Lepigonum tenue*, Greene, Pittonia, i. 63 (1887).

Capsules 6-8 mm. long, twice the length of the calyx; seeds smooth, plants much larger, and more branched than in the last.

This fine species may, perhaps, better be grouped with Nos. 1 and 2, as its habitat appears to be near the sea, if not, indeed within its influence.

Hab. Alameda, Cal. (Greene); Santa Barbara (Rothrock, 154); Santa Monica (J. C. Nevin).

(B) PERENNIALS; STEMS CÆSPITOSE FROM A THICK, WOODY ROOT.

* Maritime or alkaline flat species of the Pacific Coast.

7. TISSA MACROTHECA (Hornem.) *Arenaria macrotheca*, Hornem. in Cham. & Schlecht., Linnæa, i. 53 (1826); *Lepigonum macrothecum*, Fisch. & Meyer, Cat. Sem. Hort. Petrop. 1835).

Leaves broadly linear, 2-3 mm. wide, 2-5 cm. long; stems stout, ascending; plants dark green, entirely smooth or densely glandular pubescent..

Hab. Oak Bay, Vancouver Island (Macoun) and southward to Southern California both maritime and inland, as on "alkaline lands San Bernardino Valley, perennial, fleshy rooted, almost tuberous," (Parish, 1331).

Var. SCARIOSA, n. var. Low, (2-10 cm.), glandular; leaves broader, lanceolate-linear, crowded; stipules very large and conspicuous, ovate-acuminate, nearly as long as the leaves.

Hab. Near San Francisco (Torrey, No. 41); coast of Monterey (Hooker and Gray, 1877); and Cypress Point, near Monterey, on maritime rocks (Gray, 1885).

8. TISSA PALLIDA, Greene, in litt. Leaves broadly linear, ½ cm. long, smooth; pedicels, calyx and upper portion of the stem densely glandular pubescent, lower leaves and joints of the stem smooth; plants stout, very light colored, whence the name.

Hab. Clayey bluffs overhanging the sea, prostrate, forming dense tufts, near San Francisco, June, 1887 (Greene); Monterey? (Meehan in Herb. Phila.).

9. TISSA VILLOSA (Pers.), Britt., Bull. Torr. Club, xvi. 62.

Leaves filiform-linear, densely clustered in the lower axils, stems erect or ascending, slender, glandular pubescent; plant dark green.

Hab. In alkaline soil, Southern California, San Diego, (Cleveland, 526); alkaline ground, San José (Mrs. A. E. Bush, 1879). Also in western South America. The Californian plants differ very slightly from Andean specimens in having smaller capsules, but I have little hesitation in referring them to this species.

* * Species of the mountainous regions of North Mexico.

10. TISSA MEXICANA (Hemsl.) (*Spergularia Mexicana*, Hemsl. Bot. Biol. Cen.-Amer.).

Leaves hardly succulent, flowers "yellowish."

Hab. Near San Luis Potosi (Parry and Palmer).

No 12 [illegible]

CONTRIBUTIONS FROM THE HERBARIUM OF COLUMBIA COLLEGE.—No. 13.

New or Noteworthy North American Phanerogams, II.

BY N. L. BRITTON.

(Reprinted from the TRANSACTIONS OF THE NEW YORK ACADEMY OF SCIENCES, Vol. IX., No. 1, October, 1889.)

NEW OR NOTEWORTHY

NORTH AMERICAN PHANEROGAMS, II.[1]

Caltha flabellifolia, Pursh, Fl. Amer. Sept. ii. 390, t. 17 (1814); Torr. Compend. 224 (1826); Noll, Flora Penn. 8 (1851).

C. palustris, L. var. *flabellifolia*, T. & G., Fl. N. A. i. 27 (1838).

C. palustris, L. var. *Sibirica*, Watson, Bibl. Index, i. 9 in part, (1878), not of Regel.

C. dentata, Muhl. Cat. 55 (1813) ?

This very good species, and exceedingly interesting one, has suffered unmerited exclusion from our American handbooks, probably caused by its limited geographical range and somewhat inaccessible habitat on the higher mountains of Pennsylvania and New Jersey, so that it has been observed *in situ* by very few botanists; all who have actually seen it growing have had but one opinion as to its specific validity. My acquaintance with the plant was first made some five years since on the Shawangunk Mountains in Sussex County, N. J., where I found it growing in a deep swamp near the elevation known as High Point, and collected it in fruit only. In last June, however, through the guidance of Professor Porter, I was introduced to it in its typical locality on the Pocono plateau in Pennsylvania, in which region it was first found by Pursh, and had an opportunity to study the plant in flower. Dr. Porter has long been of the opinion that it is a valid species, and I am glad of an opportunity to express my belief in the accuracy of his conclusions, based on the same characters as those assigned in the original description.

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[1] The first part of these notes appeared in the *Bulletin of the Torrey Botanical Club*, xv. 97 et seq.

In the Pocono localities the plant grew actually in the water, in cold mountain springs and brooks, and densely shaded by overhanging bushes. The very different habit of the *C. palustris*, growing in open, sunny swamps, is a fact which does not appear to have yet been recorded.

Mr. Maturin L. Delafield, Jr., has communicated to me specimens of a *Caltha* from West Hampton, Suffolk County, N. Y., which I refer without hesitation to this mountain species. Mr. Delafield has not detected the typical *C. palustris* in the region; and knowing what we now do of the numerous elements in common possessed by the floras of the Shawangunk and Pocono Mountains with those of the coast plains, this is not as remarkable as it might at first appear.[1]

If it should seem desirable in the future to reunite it with the Old World plant which has been known as *C. palustris*, L., var. *Sibirica*, Regel (1861), it is to be remembered that this name is long antedated by *C. radicans*, Forster, Trans. Linn. Soc. viii. 324, t. 17 (1805). But it does not appear to me from the materials now at hand that this will again be suggested. Dr. Gunther Beck, in his review of the relatives of *C. palustris*, in Verhand. K. K. Zool.-Bot. Ver. Wien, xxxvi. 350 (1886), excludes *C. flabellifolia*. In Torrey and Gray's Flora the name is stated to be synonymous with *C. dentata*, of Muhlenberg's Catalogue (1813), but the description there given is not sufficiently explicit, and until the fact can be more conclusively shown I do not consider it safe to take up Muhlenberg's name.

CASTALIA TETRAGONA (Georgi), Lawson, Trans. Roy. Soc. Canada, vi. sec. iv. 112 (1888).
Nymphæa tetragona, Georgi, Reise im Russ. Reichs, i. 220 (1775).
Castalia pygmæa, Salisb. Parad. Lond. t. 68 (1806).
Nymphæa pygmæa, Ait. Hort. Kew. ed. 2, iii. 293 (1811).

This may be announced as a North American plant, having been collected in ponds along the Severn River, Keewatin, Canada, by Mr. Jas. M. Macoun, July 17th, 1886. This locality lies between Hudson's Bay and Lake Winnipeg, in latitude about 55°. It had previously been collected by Mr. R. Bell at Misinaibi River, Ontario (July, 1879). Specimens from both localities are preserved in the herbarium of the Geological and Natural History Survey of Canada. The plant may at once be distinguished from the eastern *C. odorata* var. *minor*, by its oblong leaves, sometimes nearly twice as long as broad, with narrow, acutish lobes, and the flowers still smaller with 7 to 8 rayed stigma. The identification of the American and Asiatic plants has been made on specimens of *C. pygmæa* from Khasia (Hooker and Thomson) and Japan (Albrecht, 1861). As to the relationship of Dr. Morong's *C. Leibergii* to the present species, I am not yet willing to express a positive opinion. Dr. Morong remarks, in his original description of the plant (Bot. Gazette, xiii. 124), "leaves with a broad, open sinus and obtuse lobes"; but specimens recently received from Mr. Leiberg have the sinus narrow, as in *C. tetragona*, and the lobes quite as acute, the laminæ being of precisely the same outline; this leaves practically nothing but the obtuse petals to distinguish it from the species here discussed. Indeed, some of the inner petals are much the same form as those of *C. tetragona.*

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[1] Bull. Torr. Bot. Club, xi. 126–128; xiv. 187–189.

Professor George Lawson has also examined the Canadian specimens here alluded to, and (loc. cit. 113) refers them to *C. odorata* var. *minor*, but I cannot agree with him in this. Curiously enough, in his otherwise exceedingly complete synopsis of the Nymphæaceæ he makes no mention of *C. Leibergii.*

The leaves of *C. tetragona* are of much the same size and form as those of *Nymphæa microphylla.*

CARDAMINE DOUGLASSII (Torr.).

Arabis rhomboidea, Pers. (*bulbosa*, Muhl.), var. *purpurea*, Torr. Amer. Jour. Sci. iv. 66 (1822).

Cardamine rotundifolia, var. *β* Torr. & Gray, Fl. N. A. i. 83 (1838), and *Arabis Douglassii*, Torr., as synonym.

Cardamine rhomboidea, var. *purpurea*, Torr. Fl. N. Y. i. 56 (1843), with the same synonym.

Cardamine bulbosa, var. *purpurea*, B. S. P. Prel. Cat. Anth. N. Y. 4 (1888).

C. rotundifolia, Hook. Fl. Bor.-Amer. i. 44; Wats. Bibl. Index, i. 54, not of Michaux.

After a careful study of this plant in the field and herbarium, I have come to agree with my friends, Judge Day and Professor Macoun, that it is specifically distinct from the white-flowered species with which it has been associated. The specific name adopted appears to be the earliest one available, although it has never, so far as I can make out, been published except as a synonym. Dr. Torrey must have fully intended to print it as *Arabis Douglassii*, and was later under the impression that he had actually done so, for he uses the synonym on page 83 of the "Flora of North America," referring to the place where he published it as *A. rhomboidea*, var. *purpurea* (at least to within three pages of the actual citation). This mistake has been copied by himself in the "New York Flora," and by Dr. Watson in the "Bibliographical Index," where matters are still further complicated by the erroneous reference of the plant to Michaux's *rotundifolia*, although this has been subsequently corrected by Dr. Gray in Botanical Gazette, iv. 210.

Besides the beautiful purple flowers, which unfold ten days earlier than those of *C. bulbosa*, in the locality near Newfoundland, New Jersey, first noted, I think, by Professor Joseph Schrenk, where I have studied the living plants, the species differ in the root-leaves of *Douglassii* being uniformly more nearly orbicular and the stem-leaves broader and generally more deeply dentate. The texture of the leaves is thicker, and the whole plant lower than *bulbosa*. I have found no essential difference in the fruit.

CARDAMINE FLEXUOSA, With. Bot. Arr. Brit. Plants, Ed. 3, 578 (1796).
C. sylvatica, Link, in Hoffm. Phyt. Blat. i. 60 (1803).
C. Virginica, Michx. Fl. Bor.-Amer. ii. 29 (1803), not of Linnæus.
C. hirsuta, L. var. *Virginica*, Torr. & Gray, Fl. N. A. i. 85 (1838).
C. hirsuta, L. var. *sylvatica*, Gray, Man. Ed. 5, 67 (1867).

I am indebted to Mr. Arthur Bennett, of Croydon, England, than whom no one is better acquainted with the English flora and its literature, for valuable notes respecting this widely distributed species; and I agree with him and with other British botanists that it is distinct from *C. hirsuta*. So far as I have observed, its habitat is on rocky banks in more or less shaded woodlands; that of *C. hirsuta* being either actually in the water or in very moist situations. It appears to be a smaller plant than *C. hirsuta*, with a decidedly flexuous stem, the leaves smaller and with narrower divisions. That our plants have always six stamens as against four in *hirsuta*, as stated in the English floras, I have not yet been able to satisfy myself fully; but in those which I have had opportunity to examine this distinction appears to hold good. I have collected *C. flexuosa* recently on the sides of Mount Mackay, near Port Arthur, north shore of Lake Superior.

POLYGALA VERTICILLATA, L. var. AMBIGUA (Nutt.).
P. ambigua, Nutt. Gen. ii. 89 (1818).

I have failed to separate this as a species, finding no characters which are at all constant, after studying a very extensive series of specimens.

HYPERICUM VIRGATUM, Lam. var. OVALIFOLIUM, n. var. Leaves oval, not more than twice as long as broad, mostly obtuse, and varying to obovate. Pine-barrens of New Jersey.

VITIS HEPTAPHYLLA (Buckley).
Ampelopsis heptaphylla, Buckley, Proc. Phil. Acad. Nat. Sci. 1861, 450.

The suppression of this species by Dr. Gray was, I judge, quite unwarranted; and now, from abundant material, I feel justified in contending for its specific rank, not from the mere fact of its generally developing more than five leaflets (the Virginia Creeper has sometimes seven, as was first noted, I think, by Mr. Meehan), but from other characters which are more constant. Mr. Buckley pleaded forcibly for its recognition nine years later (l. c., 1870, 136), remarking on its smaller leaflets (comparing it with the ordinary Virginia Creeper) and its "cymose panicles," which flower at the end of April, while plants of *V. quinquefolia* in the same locality do not flower until the middle or end of June. Specimens collected by Mr. Tweedy, in 1879, in Tom Greene Co., Texas, maintain the characters assigned by Mr. Buckley; and the collections of Wright, Fendler, Bigelow, Buckley, and this last, indicate a wide range for the vine in western Texas. Young's "Flora of Texas" maintains the species, and the recent monograph of M. Planchon recognizes it as a variety at least, although that author had not seen specimens.

ACER SACCHARUM, Marsh. var. NIGRUM (Michx. f.).
A. nigrum, Michx. f. Arb. Amer. ii. 238.
A. saccharinum, var. *nigrum*, Torr. & Gray, Fl. N. A. i. 248.

The adoption of Marshall's name *saccharum* for the Rock Maple in place of the more recent *saccharinum* of Wangenheim (the *saccharinum* of Linnæus applying to the Silver Maple, as recently remarked by Professor Sargent in "Garden and Forest") renders this readjustment of the varietal name necessary, if, as I contend, it is to be considered a variety, and I have so used it in the new "Flora of New Jersey."

PHASEOLUS UMBELLATUS (Muhl.).
Glycine umbellata, Muhl. in Willd. Sp. Pl. iii. 1058 (1800).
Phaseolus helvolus, Torr. & Gray, Fl. N. A. i. 280 (1838); Gray, Man. Ed. 5, 140, not of Linnæus.

Phaseolus helvolus, L. Sp. Pl. 724 (1753), belongs to the plant which appears in recent writings as *P. diversifolius*, Pers. It is therefore desirable to take up the oldest specific name available, which appears to be that of Muhlenberg.

Aster lateriflorus (L.).

Solidago lateriflora, L. Sp. Pl. ii. 879 (1753), fide Gray, Syn. Flor. 143 and 187.

Aster diffusus, Ait. Hort. Kew. iii. 205 (1789).

A. miser, Ait. l. c.

Senecio Hallii, n. sp. Nearest to *S. canus*, Hook. Stems 4–6 inches high, simple; stems, leaves, and scales of the involucre densely and persistently white-woolly all over; leaves about one inch long, spatulate, the blade about equalling the petiole; heads ¼ in. high, ½–¾ in. broad, with the rays expanded; rays about a line wide; achenes (immature) about a line high, angular, glabrous.

Yellowstone National Park, on geyserite; collected by the Rev. Dr. Charles H. Hall, of Brooklyn, N. Y., in June, 1888.

Dr. Hall collected also the *S. canus*, Hook., in the same region; and it was the great difference in appearance of the two plants that suggested to me a careful comparison of their characters. I fortunately found that a type of Hooker's species was preserved in Dr. Torrey's herbarium, and saw at once that the plant here described was different. I have evidence that it has been collected in other parts of the Rocky Mountain region. It is one of the most beautiful and interesting of the genus, its extraordinary amount of woolly tomentum fully justifying Dr. Hall's exclamation on finding it,—"looks as if it were done up in blankets."

Vaccinium disomorphum, Bigel. Fl. Bost. Ed. 2, 151 (1824), not of Michaux.

V. fuscatum, Gray, Man. Ed. I. 262 (1848), not of Aiton, fide Syn. Flor. Gamopet. 23.

V. corymbosum, L. var. *atrococcum*, Gray, Man. Ed. 5, 292 (1867).

V. corymbosum, L. var. *disocarpum*, B. S. P. Prel. Cat. Anth. N. Y. 32 (1888).

Field observations on this shrub, extended over several years, have now convinced me that it is specifically distinct from *V. corymbosum*. Indeed, I have not been able to find any intermediate forms. Its characters were distinctly pointed out by Dr. Bigelow, being essentially the small cylindric corolla of a decidedly pink color, contracted at the throat so as to become somewhat ovate (5 mm. long); the light-colored bark which tends to become shreddy; the tomentose lower leaf surfaces; and the perfectly black berries without bloom. On Staten Island and in the Pocono region, where the two species grow commonly in company, they can always be distinguished at a glance, whether in flower or fruit. I should say that they are quite as distinct as *V. Pennsylvanicum* and *V. Canadense*.

I have adopted Dr. Bigelow's spelling of the specific name, who took it from Richard in Michaux's Flora, but presume that it should be *dissomorphum*, as Dr. Torrey has it on page 446 of the first volume of the "New York Flora," where he appears to have confounded it with *V. Canadense*. Dr. Gray remarks, in the first edition of his "Manual," that the characters of the plant appear to be perfectly constant, but he subsequently changed his mind and in the fifth edition it appears only as a variety. In his "Synoptical Flora" it is given, under *V. corymbosum* var. *atrococcum*, as *V. disocarpum*, and this misprint was taken up in the Torrey Club's Preliminary Catalogue.

LIMNANTHEMUM AQUATICUM (Walt.).
Anonymos aquatica, Walt. Flor. Car. 109 (1788).
Menyanthes trachysperma, Michx. Flor. Bor. Amer. i. 126 (1803).

Mr. A. C. Apgar sends this species from a pond at Bridgeton, Cumberland Co., N. J., thus bringing it within the 100-mile circle of the New York local flora. Mr. A. Commons had previously collected it at Millsboro, Sussex Co., Del., just without the limits of the local flora.

PAULOWNIA TOMENTOSA (Thunb.).
Bignonia tomentosa, Thunb. Flor. Jap. 252 (1784).
Paulownia imperialis, Sieb. and Zucc. Flor. Jap. i. 27, t. 10 (1835).

While hardly deserving notice under this heading, it is of interest to record that this Japanese tree has established itself in rocky woods at Rocky Hill, N. J., where it flowers freely, as observed by Rev. L. H. Lighthipe.

UTRICULARIA CLEISTOGAMA (Gray).

In the fifth edition of Gray's "Manual," page 320, mention is made of the discovery by Mr. J. A. Paine, Jr., in September, 1866, in the pine-barrens of New Jersey, of a few specimens of a minute *Utricularia*, with faint pink-purple corolla not larger than a pin's head. In the "Synoptical Flora," Dr. Gray describes this plant as *U. subulata* var. *cleistogama*, as "an inch or two high, bearing one or two evidently cleistogamous flowers." It was again collected in 1881, in wet ground along Atsion River below Atsion, N. J.,—also in the pine-barrens,—by Prof. J. A. Allen, of New Haven, Conn., who distributed some specimens.

On August 18th of the present year, while botanizing at Forked River, N. J., also a region of cedar swamp and pine-barrens, I collected a number of specimens of a minute *Utricularia* with strictly cleistogamous flowers, answering the description above given by Dr. Gray, and closely resembling Prof. Allen's collections, except that the lower lip of the corolla is yellow, and the upper translucent white. There is no spur, and no *U. subulata* could be detected in the vicinity.

My plants certainly represent a species distinct from *U. subulata,* which I name *U. cleistogama.* It cannot be decided at the present time if these are specifically the same as the earlier collections, although I am inclined to consider them such, notwithstanding the difference in color of the flowers.

EPIDENDRUM TAMPENSE, Lindl. Folia Orchid. 12.

This species was described by Lindley from specimens sent him by Dr. Torrey about 1850. In looking over the genus, last summer, with Mr. Rolfe, at Kew, I noticed the original specimen and remarked that the name had not been used in any of our North American books. He assured me, and satisfied me, that it is a distinct species. On returning home, I investigated the *Epidendra* of our herbarium and found the rest of the specimens, marked "*Epidendrum,* Tampa Bay, Florida, Dr. Leavenworth." Dr. Torrey had not written the name upon the herbarium sheet; and, as the part of the "Folia" containing the description was not in his library, it is probable that he was not aware of the publication of the name. The species has since been collected by Curtiss, and distributed as "*Epidendrum venosum,* Lindl." ("North American Plants," No. 2805. Habitat, on trees, Hillsboro River, Florida).

OAKESIA SESSILIFOLIA (L.), S. Wats.; var. (?) NITIDA, n. var.

Differs from *O. sessilifolia* in its smaller leaves, which are rough-margined after the manner of *O. puberula,* and shining on both sides. Collected by myself, May 30th and 31st, 1887, at Tom's River and Cedar Bridge, Ocean Co., N. J., on the borders of swamps in the pine-barrens. The leaves of *O. sessilifolia,* so far as I have seen them, are always markedly glaucous beneath and dull green above. The young capsules of the new variety are on peduncles 10 mm. long, the corolla and mature capsule not seen. Dr. Watson describes (Proc. Amer. Acad. xiv. 269) the capsules of *O. puberula* as sessile or nearly so; but this is evidently a slip of the pen, for specimens labelled by him in the Torrey herbarium bear capsules on stalks 1 and 2 cm. long.

CYPERUS BUCKLEYI, Britt. Bull. Torr. Bot. Club, xi. 86 (1884).

This species, originally described from the Valley of the Lower Rio Grande, has since been found by Mr. Pringle on hills near Chihuahua (1040), and in the Sierra Madre (1167), and by the same collector in the Santa Rita Mountains, Arizona. Fred.

Müller's No. 1989 from Orizaba, and Bourgeau's No. 432 from Pedregal, near Mexico, appear to be the same.

CYPERUS LÆVIGATUS, L., has recently been collected in South Carolina by Mr. Gerald McCarthy—the first evidence we have had of its occurrence on the east coast.

SCIRPUS ATROVIRENS, Muhl. var. PALLIDUS, n. var.

Whole plant pale, including the inflorescence, which is composed of larger heads than in the type, and is more contracted; glumes more squarrose. A well-marked variety, but I am so far unable to detect further differences. The achenium is exactly like that of the eastern plant. Indian Territory (E. Palmer, No. 358, 1868); Mitchell Co., Kansas (M. A. Carleton, 1886); Hitchcock Co., Neb. (H. J. Webber, 1888).

SCHŒNUS NIGRICANS, L., which we have had as North American from Florida only, comes now from the San Bernardino Mountains, southern California, where it was collected in June, 1887, by Mr. S. B. Parish (No. 2058).

HOMALOCENCHRUS, Mieg. Hall. Stirp. Helv. ii. 201 (1768), plainly antedates *Leersia,* Sw. Nov. Gen. et Sp. Pl. 21 (1788), —which is one reason why the latter should not be used, while another is that *Leersia,* Hedw. Fund. Musc. ii. 88 (1782) (*Encalypta,* Schreb.), a genus of Musci, is also older, containing those mosses which have recently been referred back to *Leersia* (Braithwaite, British Moss Flora, i. 279).

Our northern species must receive binomials as follows:

HOMALOCENCHRUS ORYZOIDES (L.), Poll. Enum. Pl. Palat. (1776) = *Leersia oryzoides,* Sw.

HOMALOCENCHRUS VIRGINICA (Willd.)=*Leersia Virginica,* Willd. Sp. Plant. i. 325 (1797).

PANICUM NITIDUM, Lam. var. PAUCIFLORUM (Vasey).

P. dichotomum, var. *pauciflorum,* Vasey in Columbia College Herbarium.

This is a very slender, smooth grass, with a simple panicle of five to ten divaricate branches, and these again very sparingly divided and filiform, the whole number of flowers on any single panicle not exceeding twenty. The flowers are larger than in ordinary forms of either *dichotomum* or *nitidum,* the stem-leaves linear, acuminate, distant, about 5 cm. long, the radical short and ovate.

Collected by myself on a mountain east of Lake Hopatcong, Morris Co., New Jersey, July, 1884.

PANICUM NITIDUM, Lam. var. VIRIDE (Vasey).
P. dichotomum, L. var. *viride*, Vasey, Bull. 8, Bot. Div. U. S. Dept. Agric. p. 30 (1889).

I think this a very well-marked woodland variety, but should refer it to *P. nitidum* rather than to *P. dichotomum.* I have observed and collected it frequently in the highlands of New Jersey.

CONTRIBUTIONS FROM THE HERBARIUM OF COLUMBIA COLLEGE.—No. 14.

A LIST
OF
STATE AND LOCAL FLORAS OF THE UNITED STATES AND BRITISH AMERICA.

BY N. L. BRITTON.

[Reprinted from the ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Vol. V.]

W. G. FARLOW.

9

V.—*A List of State and Local Floras of the United States and British America.*

BY N. L. BRITTON.

Read Feb. 24, 1890.

In the *Bulletin of the Torrey Botanical Club,* vols. viii, *et seq.*, there are published "Contributions towards a List of the State and Local Floras of the United States," by Mr. W. R. Gerard and myself. The present paper is an attempt to bring this up to date and supply the numerous omissions of the former work, with the addition of lists published for the Canadian Territory. In this I have been greatly aided by botanists all over the country, and it is believed that the present enumeration contains most of the local floras. No attempt has been made to incorporate all the notes and short lists of local observations, but it has been found difficult to draw the line in many cases. As in the former contribution lists of species without exact localities have been indicated by (A); those giving stations by (B); those giving stations with notes or occasional descriptions by (C); and descriptive floras by (D).

I cannot hope to have covered all the literature of this subject, and will be grateful for further notes and memoranda in the view of preparing a supplementary list. The present is brought down to May, 1890.

I. THE EASTERN STATES.

1.—An Account of some of the Vegetable Productions growing in this part of America, botanically arranged. By Rev. M. Cutler. (D.)
Mem. Amer. Acad. Arts & Sci., i, 396–493. Boston, 1785.

2.—Enumeration of some New England Lichens. By Edward Tuckerman. (D.)
Bost. Jour. Nat. Hist., ii, 245–262; iii, 281–306; 438–464; and v, 93–104. 1838–1847.

3.—Notice of some Rare Plants of New England, with descriptions of some new species. By Wm. Oakes. (C.)
Hovey's Mag. Horticult., vii, 178–186. Reprinted, 8vo. pamph. pp. 8. Boston, 1841.

4.—NOTICE OF SOME OF THE PLANTS OF NEW ENGLAND. By Wm. Oakes. (B.)
Hovey's Mag. Horticult., xiii, 217–220. Boston, 1847.

5.—CONTRIBUTIONS TO NEW ENGLAND MYCOLOGY. By Chas. J. Sprague. (B.)
Proc. Bost. Soc. Nat. Hist., v, 325–331, and vi, 315–321. 1856 and 1858.

6.—ON THE SHORE ZONES AND LIMITS OF MARINE PLANTS ON THE NORTHEASTERN COAST OF THE UNITED STATES. By Alex. F. Kemp. (C.)
Can. Nat. and Geol., vii, 20–34. 1862.

7.—FURTHER ENUMERATION OF NEW ENGLAND FUNGI. By Chas. C. Frost. (A.)
Proc. Bost. Soc. Nat. Hist., xii, 77–81. 1868.

8.—LIST OF THE SEAWEEDS OR MARINE ALGÆ OF THE SOUTH COAST OF NEW ENGLAND. By W. G. Farlow, M.D. (B.)
Reps. U. S. Fish Commission. Washington, 1871 and 1872.

9.—CATALOGUE OF THE BOLETI OF NEW ENGLAND WITH DESCRIPTIONS OF NEW SPECIES. By C. C. Frost. (D.)
Bull. Buffalo Soc. Nat. Sci., ii, pp. 100–105. 1874.

10.—MARINE ALGÆ OF NEW ENGLAND AND ADJACENT COAST. By W. G. Farlow, M.D. (D.)
Rep. U. S. Fish Commission for 1879, pp. 1–210; 15 plates. Reprinted, pp. 210, pl. 15. Washington, 1881.

11.—GUIDE TO THE PRINCIPAL ORDERS OF CRYPTOGAMS AND THE COMMONER AND MORE EASILY DISTINGUISHED NEW ENGLAND GENERA. By Frederick LeRoy Sargent. (D.)
12mo., pp. 38. Cambridge, 1886.

MAINE.

12.—BOTANICAL REPORT ON PLANTS NOT AS YET CREDITED TO MAINE. By George L. Goodale. (B.)
6th Ann. Rep. Sec. Board Agric., 125–129. 1861.

13.—A CATALOGUE OF THE FLOWERING PLANTS OF MAINE. (Includes vascular Cryptogams.) By George L. Goodale. (B.)
Proc. Portland Soc. Nat. Hist., i. 37–63; 127–138. Portland, 1862.

14.—DECADES OF MAINE FUNGI. By M. C. Cooke. (D.)
Proc. Portland Soc. Nat. Hist., i, 179–185. Portland, 1862.

15.—LIST OF PLANTS NOTICED IN THE MAINE WOODS IN THE YEARS 1853 AND 1857. By H. D. Thoreau. (B.)
Appendix to "Maine Woods." Boston, 1866.

16.—THE PORTLAND CATALOGUE OF MAINE PLANTS. (A.)
Pub. by Port. Soc. Nat. Hist. 8vo. pamph. pp. 12. Portland, 1868.

17.—WEEDS OF MAINE. By F. L. Scribner. (D.)
14th Ann. Rep. Sec. State Board Agric., 239–288. 1869.

18.—*LIST OF MARINE ALGÆ COLLECTED NEAR EASTPORT, ME., IN AUGUST AND SEPTEMBER, 1872, IN CONNECTION WITH THE WORK OF THE U. S. FISH COMMISSION UNDER PROF. S. F. BAIRD. By Daniel C. Eaton. (B.)
Trans. Conn. Acad. Sci., ii, 343–350. New Haven, 1873.

19.—ORNAMENTAL AND USEFUL PLANTS OF MAINE. By F. Lamson Scribner. (D.)
19th Ann. Rep. Sec. Maine Board Agric., 157–237. 1874.

20.—LIST OF PLANTS FOUND IN MAINE SINCE PUBLICATION OF PORTLAND CATALOGUE. By Frank A. Mansfield. (B.)
"Home and Farm." Augusta, 1881.

21.—GRASSES OF MAINE. By C. H. Fernald. (D.)
Pamph., 8vo., pp. 63; 42 plates. 1885.

22.—DESMIDS OF MAINE. By Wm. West. (A.)
Journ. Bot., xxvi, 339, 340. 1888.

23.—THE FRESH-WATER ALGÆ OF MAINE. By F. L. Harvey. (C.)
Bull. Torr. Bot. Club, xv, 155–161 (1888); xvi, 181–188 (1889).

Hancock County.

24.—A LIST OF WEEDS OF HANCOCK COUNTY. By Samuel Wasson. (D.)
Ann. Rep. Sec. State Board Agric., 1878, 236–238.

NEW HAMPSHIRE.

25.—CATALOGUE OF THE PLANTS OF NEW HAMPSHIRE. By Wm. F. Flint. (A.)
Geol. N. Hamp., i, 395–415; 651, 652. Concord, 1874.
Amer. Month. Mag. & Critical Review, i, 441. 1817.

26.—NEW HAMPSHIRE GRASSES. By Wm. F. Flint. (C.)
New Hampshire Agricultural Rep., 1879, 281–307.

27.—A PRELIMINARY CATALOGUE OF THE FLOWERING PLANTS AND HIGHER CRYPTOGAMS, GROWING WITHOUT CULTIVATION WITHIN THIRTY MILES OF HANOVER, N. H., TO WHICH IS APPENDED A LIST OF THE VERTEBRATES OF THE SAME REGION. By Henry G. Jesup. (B.)
Pamphlet, 8vo. pp. 74. Hanover, 1882.

28.—THE TREES AND SHRUBS COMPOSING THE NEW HAMPSHIRE FOREST. By Wm. F. Flint. (C.)
Rep. Forestry Comm. N. H., 1885, 30–71.

Carroll County.

29.—SOME CRYPTOGAMOUS PLANTS GATHERED IN THE VICINITY OF KEARSARGE MT., N. H. By J. L. Russell. (B.)
Hovey's Mag. Hortic. Bot., etc., ix, 140, 141. 1843.

Coos County.

30.—FLORULA OF THE WHITE MOUNTAINS OF NEW HAMPSHIRE. By C. S. Rafinesque, after Jacob Bigelow in N. E. Journ. Med. & Surg., Oct. 1816. (A.)

31.—NOTICE OF SOME OF THE MOSSES OF NEW ENGLAND. By William Oakes.
Hovey's Mag. Horticulture, Botany, etc., xiii, 171–174. 1847. (These are from the White Mts. chiefly, and include Musci and Jungermanniaceæ.)

32.—LIST OF THE PLANTS FOUND IN NEW HAMPSHIRE ONLY ON ALPINE SUMMITS. By C. H. Hitchcock. (A.)
Geol. N. H., i, 571, 572. 1874.

33.—CANADIAN PLANTS NATURALIZED ON MT. WASHINGTON. By C. H. Hitchcock. (A.)
Loc. cit., 572, 573. 1874.

34.—List of Plants collected by E. W. Southwick on the White Mountains of New Hampshire, July 15, 1841, with notes and references. By J. Barratt, M.D. (B.)
From the "Classic." 8vo. pamph. pp. 11.

35.—Catalogue of the Alpine and Sub-Alpine Flora of the White Mountains of N. H. By Prof. J. W. Chickering. (A.)
Field and Forest, ii, 98, 99. Washington, 1876.

36.—Notes on the Cryptogamic Flora of the White Mountains. By W. G. Farlow. (D.)
Appalachia, iii, 232–251. 1884.

(Mr. John Robinson informs me that in the Library of the Massachusetts Horticultural Society there is a pamphlet on White Mountain Plants, by J. H. Huntington, enumerating some 60 species, "read January 10, 1887." I have not been able to ascertain its place of publication.)

VERMONT.

37.—Catalogue of Vermont Plants. By Wm. Oakes. (B.)
Thompson's Nat. Hist. Vt., 173–208. Burlington, 1842. Also pamph. 8vo. pp. 36.

38.—Appendix to Oakes' Catalogue of Vermont Plants. By Joseph Torrey. Ibidem. Ed. 1853.

39.—Catalogue of Cryptogamous or Flowerless Plants of Vermont. By Chas. C. Frost. (B.)
Archives of Sci. and Trans. Orleans Co. Soc. Nat. Hist., i, 78–81; 111–117; 152, 153; 192–195; 234–240; 249–252. 1871.

40.—Catalogue of Vermont Plants: Phænogams. By Geo. H. Perkins. (B.)
Archives of Sci. and Trans. Orleans Co. Soc. Nat. Hist., i, 161–166; 181–190; 215–218; 231–234; 252, 253. 1871.

41.—A General Catalogue of the Flora of Vermont. By George H. Perkins, Ph.D. (B.)
Pamph., 8vo. pp. 49. Montpelier, 1882. Also in Vermont Agricultural Report for 1882, 93-139.

42.—Catalogue of the Plants of Middlebury. By Edwin James.
Hall's Statist. Acc't of Town of Middlebury, 1821.

43.—Catalogue of the Flora of Vermont, including Phænogamous and Vascular Cryptogamous Plants Growing without Cultivation. By Geo. H. Perkins, Ph.D. (B.)
10th Rep. State Board of Agriculture, 231–302. Also Pamph., 8vo. pp. 74. Burlington, 1888.

MASSACHUSETTS.

44.—Catalogue of the Plants Growing without Cultivation in the vicinity of Amherst College. By Edward Hitchcock. (B.)
8vo., pamph., pp. 64. Amherst, 1829.

45.—Catalogue of the Plants Growing without Cultivation in the State of Massachusetts. By Edward Hitchcock. (B.)
Rep. on Geol., etc., of Mass., 599–649. Amherst, 1833.

46.—MASSACHUSETTS CATALOGUE OF PLANTS. By Edward Hitchcock. (B.)
8vo., pamph., pp. 54. Amherst, 1835.

47.—REPORT ON THE HERBACEOUS PLANTS OF MASSACHUSETTS. By Chester Dewey. (D.)
In Zool. and Botan. Survey Mass. 8vo. pp. 277. Cambridge, 1840.

48.—ATTEMPT TO ASCERTAIN SOME OF THE HEPATIC MOSSES OF MASSACHUSETTS, WITH REMARKS. By John Lewis Russell. (C.)
Bost. Jour. Nat. Hist., iii, 465–469. 1841.

49.—MUSCI OF EASTERN MASSACHUSETTS. By Rev. J. L. Russell. (C.)
Bost. Jour. Nat. Hist., v, 172–188. 1845.

50.—REPORT ON THE INDIGENOUS MEDICAL BOTANY OF MASSACHUSETTS. By Stephen W. Williams, M.D. (C.)
Trans. Am. Med. Assoc., 1849, 863–927.

51.—REPORT ON THE TREES AND SHRUBS GROWING NATURALLY IN THE FORESTS OF MASSACHUSETTS. By Geo. B. Emerson. (D.) Boston, 1846.
Zool. and Bot. Surv. Mass. 8vo. pp. 547. 2d ed., 2 vols. 8vo. pp. 624. Boston, 1875. 3d ed. 1878.

52.—CATALOGUE OF THE PLANTS GROWING WITHOUT CULTIVATION WITHIN THIRTY MILES OF AMHERST COLLEGE. By Edward Tuckerman and Chas. C. Frost. (B.)
8vo., pamph., pp. 98. Amherst, 1875.

53.—LIST OF THE NATIVE TREES OF MASSACHUSETTS, WITH NOTES UPON CERTAIN NATURALIZED SPECIES. By F. B. Hough. (C.)
Rep. on Forestry, 406–416. Washington, 1877.

54.—DATE OF FLOWERING OF TREES AND SHRUBS IN EASTERN MASSACHUSETTS, 1880. By John Robinson. (A.)
Trans. Mass. Hort. Soc., 1880, 161–173. Also reprint, pp. 13, 1880.

55.—DATE OF FLOWERING OF TREES AND SHRUBS IN EASTERN MASSACHUSETTS, 1881. By John Robinson. (A.)
Trans. Mass. Hort. Soc., 1881, 348–358.

56.—A LIST OF PLANTS FOUND GROWING WILD WITHIN THIRTY MILES OF AMHERST. By N. A. Cobb. (B.) Includes Pteridophyta, Bryophyta, Thallophyta, and Protophyta.
Pamph., 8vo., pp. 51. Northampton, 1887.

57.—LIST OF DESMIDS FROM MASSACHUSETTS. By Wm. West. (A.)
Jour. Royal Micros. Soc., 1889, 16–21.

Berkshire County.

58.—CATALOGUE OF PLANTS FOUND IN THE COUNTY OF BERKSHIRE, MASS. By Rev. Chester Dewey. (B.)
In "A History of the County of Berkshire," 8vo. pp. 43–86. Pittsfield, 1829.

Bristol County.

59.—CATALOGUE OF PLANTS FOUND IN NEW BEDFORD AND ITS VICINITY. By E. W. Hervey. (A.)
Pamph., pp. 30. New Bedford, 1860.

Dukes County.

60.—Flora of Penikese Island. By D. S. Jordan. (A.)
Amer. Naturalist, viii, 193–197. 1874.

Essex County.

61.—List of Plants Collected from March 25 to November 27, 1853, Principally from North Danvers, with a few from Pleasant Pond, Wenham. By Geo. Osgood. (A.)
Salem Gazette, May 26, June 2, 1854. Reprinted.

62.—Studies of the Essex Flora; a complete enumeration of all Plants found growing Naturally within the limits of Lynn and the towns adjoining. By C. M. Tracy. (B.)
8vo., pamph., pp. 87. Lynn, 1858.

63.—List of Plants collected in Salem and its Vicinity, in 1857. By S. B. Buttrick. (A.)
Proc. Essex Inst., ii, 233–242. Salem, 1860.

64.—A List of Trees, Shrubs, and Plants of our Cape (Cape Ann), which have come under the notice of Mr. Calvin W. Pool, of Rockport. (A.)
In "Pigeon Cove and Vicinity." By Henry W. Leonard, pp. 151-156. Boston, 1873.

65.—List of the Ferns of Essex County. By John Robinson. (B.)
Bull. Essex Inst. vii, 44–54, 1875; addenda, loc. cit., viii, 147, 148, 1875; ix, 98, 1877.

66.—Flora of Georgetown, Mass. By Mrs. C. N. S. Horner. (A.)
Georgetown "Advocate," Feb. and Mar. 1876.

67.—Flora of Boxford. By Miss M. E. Perley. (A.)
Georgetown "Advocate," March, 1876.

68.—Notes on the Native and Extensively Introduced Woody Plants of Essex County. By John Robinson. (B.)
Bull. Essex Inst., xi, 72–106. Salem, 1879.

69.—Flora of Essex County. (Includes Phænogams, Vascular Cryptogams, Lichens, Mosses, Hepaticæ, Characeæ, and Marine Algæ with extensive notes, and historical preface and sketch of early Essex County Botanists.) By John Robinson.
Pub. by Essex Institute, 8vo. pp. 200. Salem, 1880.

70.—Introduced Plants found in the Vicinity of a Wool-scouring Establishment. By William P. Alcott.
Bull. Essex Inst., xiii, 162–166. 1881. Also reprinted.

71.—Notes on the Flora of South Georgetown. By Mrs. Charlotte N. S. Horner. (A.)
Bull. Essex Inst., xv, 107–110. 1883. Reprinted, pp. 4.

72.—List of Native and Introduced Plants observed in Flower in the Vicinity of Salem, during the Spring of 1886, on or before May 1. By J. H. Sears. (A.)
Bull. Essex Inst., xviii, 95–98. 1886.

Middlesex County.

73.—CATALOGUE OF AMERICAN AND FOREIGN PLANTS CULTIVATED IN THE BOTANIC GARDEN, CAMBRIDGE, MASS. By W. D. Peck. (A.)

Pamph., 8vo. Cambridge, 1818. Also Appendix to Rep. and Journ. Mass. Hort. Soc., v, part 1. 1818.

74.—NOTICE OF SOME PLANTS FOUND IN THIS VICINITY (CHELMSFORD), MARCH, 1840. By J. L. Russell. (A.)

Hovey's Mag. Hortic. Bot., etc., vii, 130, 131. 1841.

75.—FLORA OF MEDFORD. By Geo. Davenport. (B.)

"Medford Chronicle," 1875–1876.

76.—A LIST OF PLANTS GROWING WITHOUT CULTIVATION IN MALDEN AND MEDFORD, MASS., WITH SOME CONTRIBUTIONS TO A FLORA OF MIDDLESEX COUNTY. Published by the Middlesex Institute. (B.)

Pamph., 8vo. pp. 19. Malden, 1881.

77.—A PARTIAL LIST OF THE NATIVE FLORA OF WALTHAM, MASS. By the Botany Club of Waltham. (A.)

Pamph., pp. 36. Waltham, 1883.

78.—FLORA OF MIDDLESEX CO., MASSACHUSETTS. By L. L. Dame and F. S Collins. (B.)

8vo. pp. 201. Malden, Middlesex Inst., 1888.

Nantucket County.

79.—CATALOGUE OF PLANTS GROWING WITHOUT CULTIVATION ON THE ISLAND OF NANTUCKET. By Maria L. Owen. (A.)

In "Island of Nantucket: what it was and what it is." Compiled by Edw. K. Goodfrey, 38–47. 1882.

80.—A CATALOGUE OF PLANTS GROWING WITHOUT CULTIVATION IN THE COUNTY OF NANTUCKET, MASS. By Maria L. Owen. (B.)

Pamph., 8vo. pp. 87. Northampton, 1888. See, also, J. H. Redfield, in Proc. Acad. Nat. Sci., Phila., 1885, 378, 379.

Norfolk County.

81.—LIST OF TREES AND PLANTS GROWING NATURALLY IN MILTON, MASS. By J. R. Churchill. (B.)

History of Milton, Mass., published by a Committee of the Town, 600–613. Also Pamph., 8vo. pp. 16. 1887.

Suffolk County.

82.—FLORULA BOSTONIENSIS; A COLLECTION OF THE PLANTS OF BOSTON AND ITS VICINITY. By Jacob Bigelow, M.D. (D.)

8vo. pp. 268. Boston, 1814. 2d ed., pp. 424, 1824; 3d ed., pp. 468, 1840.

83.—BEAUTIFUL PLANTS GROWING WILD IN THE VICINITY OF BOSTON. By E. B. Kendrick. (D.)

Hovey's Mag. Horticulture, Botany, etc., i, 368–377; 411–418; 453–458, 1835; ii, 14–17; 55–57; 131–134; 171–174, 1836.

84.—LIST OF FUNGI FOUND IN THE VICINITY OF BOSTON. By W. G. Farlow, M.D. (A.)

Bull. Bussey Inst., i, 430–439, 1876; and ii, 224–252, 1878.

85.—Catalogue of the Flora of "Oak Island," Revere, Mass., with Notes. By Herbert A. Young. (B.)
Bull. Essex Inst., xiv, 141–157. 1882. Reprinted.

Worcester County.

86.—Notice of Some Rare and Beautiful Plants found at Hubbardston, Mass., May to August, 1837. By J. L. Russell. (A.)
Hovey's Mag. Hortic. Bot., etc., iii, 410–413. 1837.

87.—Catalogue of the Phænogamous and Vascular Cryptogamous Plants of Worcester County, Massachusetts. By Joseph Jackson. (B.)
Pamph., 8vo. pp. 48. Worcester, 1883. Published by the Worcester Natural History Society.

88.—Catalogue of the Phænogamous and Vascular Cryptogamous Plants of Fitchburg and Vicinity. By E. Adams Hartwell and others. (B.)
Pamphlet, 8vo. pp. 39. 1885.

RHODE ISLAND.

89.—Catalogue of Plants Collected by the Botanical Department of the Providence Franklin Society, Principally in Rhode Island, in 1844. (By a Committee consisting of S. T. Olney, George Hunt, George Thurber, and Henry B. Metcalf.) (A.)
Published by the Franklin Society. 8vo., pamph., pp. 8. Providence, 1845.

90.—Additions to the Published Lists of the Providence Franklin Society. By S. T. Olney. (B.)
Proc. Providence Franklin Soc., i, 1–42, 1846 and 1847.

91.—Algæ Rhodiaceæ. A List of Rhode Island Algæ. By Stephen T. Olney. (B.)
Pamph., 8vo. pp. 13. Providence, 1871. Also in Lens, i, 129–135. Chicago, 1872.

92.—Contributions toward a Complete List of Rhode Island Diatoms. By S. A. Briggs (addition to Olney's Catalogue). (A.)
Lens, ii, 161–163. Chicago, 1873.

93.—Native Plants of the Island of Rhode Island. (A.)
Proc. Newport Nat. Hist. Soc., 1884–1885, 87–89; 1885–1886, 13–15.

94.—Plants of Rhode Island, being an Enumeration of Plants Growing without Cultivation in the State of Rhode Island. By Jas. L. Bennett. (B.)
8vo. pp. 128. Providence, 1888. Proceedings of Providence Franklin Society.

CONNECTICUT.

95.—List of the Marine Algæ Growing in Long Island Sound within Twenty Miles of New Haven. By F. W. Hall. (B.)
Bull. Torr. Bot. Club, vi, 109–112. 1876.

96.—List of Lichens Growing within Twenty Miles of Yale College. By F. W. Hall. (B.)
Amer. Naturalist, xi, 170–175. 1877.

97.—CATALOGUE OF THE FLOWERING PLANTS AND HIGHER CRYPTOGAMS GROWING WITHOUT CULTIVATION WITHIN THIRTY MILES OF YALE COLLEGE. (B.)
Pubd. by the Berzelius Soc., 8vo., pamph., pp. 72. New Haven, 1878.

98.—A CATALOGUE OF ALL PHÆNOGAMOUS PLANTS AT PRESENT KNOWN TO GROW WITHOUT CULTIVATION IN THE STATE OF CONNECTICUT. (From the Report of the Sec. Conn. Board Agric., 1885.) By James N. Bishop. (B.)
Pamphlet, 8vo., pp. 16. Hartford, 1885.

Litchfield County.

99.—LIST OF PLANTS GROWING SPONTANEOUSLY IN LITCHFIELD AND IN ITS VICINITY. By John P. Brace. (B.)
Silliman's Journal (I), iv, 69–86; 292–309. 1822.

100.—THE PTERIDOPHYTA OF LITCHFIELD CO., CONN. By Lucien M. Underwood. (B.)
Bull. Torr. Bot. Club, xi, 7, 8. 1884.

New Haven County.

101.—CATALOGUE OF THE PHÆNOGAMOUS PLANTS AND THE FERNS GROWING WITHOUT CULTIVATION WITHIN FIVE MILES OF YALE COLLEGE. By William Tully, M.D. (A.)
From Appendix to Baldwin's Hist. Yale College. 8vo., pamph., pp. 38. New Haven, 1831.

102.—CATALOGUE OF THE PHÆNOGAMOUS AND VASCULAR CRYPTOGAMOUS PLANTS FOUND GROWING IN MERIDEN, CONN. By Emily J. Leonard. (A.)
Trans. Scientif. Assoc. Meriden, i, pp. 40. 1885.

103.—PLANTS FOUND GROWING IN MERIDEN, CONN., SINCE ISSUE OF CATALOGUE IN 1885. Mrs. E. B. Kendrick. (B.)
Trans. Meriden Sci. Assoc., ii, 54–57. 1886.

104.—A LIST OF FOREST TREES AND SHRUBS TO BE FOUND IN MERIDEN, CONN. By Chas. H. S. Davis, M.D. (C.)
Trans. Sci. Assoc. Meriden, iii, 46–78. 1888.

105.—DIATOMS AND OTHER ALGÆ OF NEW HAVEN HARBOR AND ADJACENT WATERS. By Wm. A. Terry. (B.)
Amer. Month. Micros. Journ., ix, 225–227. 1888.

New London County.

106.—A CATALOGUE OF WILD PLANTS GROWING IN NORWICH AND VICINITY, ARRANGED IN THE ORDER OF FLOWERING FOR THE YEAR 1882. By Geo. R. Case and Wm. A. Setchell. (A.)
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ADDENDA.

No. 21. The real title is:

The New Plants of Maine. A List Supplementary to the Portland Catalogue.

"Home and Farm," October 22, 1881, 2d page.

No. 429. The place of publication is:

The Crawford Avalanche, July, 1882.

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 15.

A Descriptive List of Species of the Genus Heuchera.

BY WM. E. WHEELOCK.

(Reprinted from the BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. XVII., No. 8, Aug., 1890.)

A Descriptive List of Species of the Genus Heuchera.

BY WM. E. WHEELOCK.

The genus is accepted as defined by Bentham and Hooker, Gen. Pl. i. 638.

The description of the calyx given below, including its dimensions, refers in every case to the calyx at the time of flowering; the fruiting calyx being, as a rule, much larger and quite different in form.

§ 1. Stamens exserted sooner or later.
  † Flowering calyx 1" to 1½" long.
    * Inflorescence loosely paniculate or cymose-paniculate.
      1. *H. Rugelii.*
      2. *H. glabra.*
      3. *H. micrantha.*
      4. *H. villosa.*
    ** Inflorescence cymose-subspicate.
      5. *H. minutiflora.*
    *** Inflorescence a long, narrow panicle; flowers clustered.
      6. *H. pilosissima.*
  †† Flowering calyx 1½" to 3" long.
    * Inflorescence a large, densely flowered, narrow thyrsus.
      7. *H. maxima.*
    ** Inflorescence paniculate or cymose-paniculate.
      8. *H. Americana.*
      9. *H. longipetala.*
      10. *H. Orizabensis.*
      11. *H. rubescens.*
    *** Inflorescence glomerate-spicate, often secund.
      12. *H. bracteata.*
  ††† Flowering calyx 3" to 5" long.
    * Inflorescence an open, spreading panicle.
      13. *H. pubescens.*
    ** Inflorescence a narrow panicle.
      14. *H. hispida.*

§ 2. Stamens always included.
† Flowering calyx 1″ to 2″ long.
‡ Flowering calyx campanulate.
* Inflorescence a long, narrow, racemose panicle.
15. *H. Nova-Mexicana.*
** Inflorescence a short racemose panicle.
16. *H. Hallii.*
‡‡ Flowering calyx almost rotate, limb flat, dilated.
17. *H. parvifolia.*
†† Flowering calyx 2″ to 5″ long.
* Inflorescence a loose, few-flowered raceme.
18. *H. racemosa.*
19. *H. Williamsii.*
** Inflorescence thyrsoid.
20. *H. sanguinea.*
*** Inflorescence more or less spicate.
21. *H. cylindrica.*

§ 1. Stamens exserted sooner or later.
† Flowering calyx 1″ to 1½″ long.
* Inflorescence loosely paniculate or cymose-paniculate.

1. H. RUGELII, Shuttlew.; Kunze, Linnæa, xx. 43, (1847).

Slender stems, 6′–2° high, and also petioles, glandular-hirsute to lanate-villous; leaves 2′ to 5′ broad, round-reniform, slightly 7 or 9 lobed, lobes broad; calyx at time of flowering campanulate, about 1″ long, beset with scattered soft hairs; petals small, linear-spatulate, two to three times as long as calyx lobes; stamens much exserted.

North Carolina.—Broad River, Rugel, Porter; Macon Co., Boynton; Burke Co., Torr. Herb.; Transylvania Co., J. D. Smith. *Tennessee.*—Warmsprings, Rugel; Cumberland Mts., Gattinger. *Illinois.*—Union Co., French; Makanda, Forbes.

2. H. GLABRA, Willd.; Rœm and Schult. Syst. vi. 216, (1820).

Tiarella colorans, Graham, Edinb. Phil. Journ., 349, (1829).

H. divaricata, Fisch.; Seringe, D.C. Prodr. iv. 51, (1830).

Slender; stems, usually bearing one or two leaves, 1° to 2° high, almost glabrous up to the minutely glandular pedicels; root-leaves 2′ to 3′ broad, glabrous or nearly so, incised, lobes 7 or 9, acute; calyx at time of flowering about 1″ long, campanulate, glandular-pubescent; petals rather narrowly spatulate with a slender claw, about three times as long as calyx lobes; stamens much exserted.

Oregon.—Tolmie. *Washington.*—Tweedy; Base Mt. Paddo

(Adams), Suksdorf, No. 546; Fort Vancouver, Hooker. *British Columbia.*—Tolmie, McKay; Selkirk Range, Macoun; Norfolk Sound, Eschscholtz; Observatory Inlet, Scouler. *Alaska.*—Sitka, Bischoff, Bongard; Popoff St., Dall.; Kodiak, Kellogg, No. 257; Harrisburg, Meehan.

3. H. MICRANTHA, Dougl.; Lindl. Bot. Reg. xv. t. 1302. (1830).

H. Barbarossa, Presl. Rel. Hænk. ii. 56, (1835).

Stems, usually bearing a few leaves, 1° to 2° high, glabrous or slightly villous with rusty hairs; petioles and larger veins of the leaves on the lower surface more or less villous; root-leaves 2′ to 3′ broad, ovate-cordate, unequally 5 to 9-lobed, veins on lower surface distinct; calyx at time of flowering campanulate, about 1″ long, lobes sparsely covered with fine hairs; petals narrowly spatulate, two to three times as long as calyx lobes; stamens moderately exserted.

Mexico.—Hacienda de Regla, Dr. Halsted. *California.*—Monterey, Parry; Nevada Falls, Redfield, No. 97; Marin Co., Vasey, No. 174; Yosemite Valley and Mts., Torrey, No. 151; Yosemite Valley, Brewer, No. 1,667; Yuba, Bigelow, Bridges, No. 128; Aptos, Pringle, Bolander, Nos. 2,463 and 6,351; Oakland Redwoods, Bolander, No. 121; San Luis Obispo, Palmer, No. 124; Cañon S. of Diablo, Brewer, Nos. 1,100 and 1,155; Plumas Co., Mrs. Ames; Spanish Peak, Mrs. Austin; Oakland Hills, Kellogg and Harford, No. 243; Mendocino Co., Vasey, Bolander, No 6,531; Santa Lucia Mts., G. R. Vasey, No. 173. *Oregon.*—Nuttall, Lieut. Mullen, Elihu Hall, No. 159; Klickitat Co., Suksdorf. *Washington.*—Yakima, Brandegee, No. 298; Cascades, Kellogg and Harford; Columbia River, Nuttall, Suksdorf, Scouler, Barclay; Puget Sound, U. S. Explor. Exp. *Vancouver's Island.*—Lyall, Macoun; Mt. Benson, Macoun. *British Columbia.*—Agassiz, Macoun; Franklin's Journey, Hooker; Victoria, Dawson.

4. H. VILLOSA, Michx., Fl. i. 172, (1803).

H. caulescens, Pursh., Fl. i. 188, (1814).

H. acerifolia, Raf., Med. Fl. i. 241 and 244, (1828).

H. parviflora, Bartling, Ind. Sem. h. Gœtt., (1838).

H. Curtisii, Gray, Amer. Journ. Sci. (I.), xlii. 15. (1842)?

Stems, naked or bearing a few small leaves, 1° to 3° high, at base villous with rusty hairs, as are also the petioles and the larger veins on the lower surface of the leaves; the entire plant, in some specimens, nearly or quite glabrous; root-leaves 3′ to 5′

broad, acutely or obtusely 7 or 9-lobed; calyx at time of flowering about 1″ long, campanulate; petals linear-spatulate, about twice as long as calyx lobes; stamens much exserted.

The species as here accepted exhibits a remarkable variety of leaf forms.

West Virginia.—On New River, Porter. *Virginia.*—Porter; Natural Bridge, Gray and Carey, Dr. and Mrs. Britton; South Peak of Otter and Bedford Co., Curtiss; Giles Co., Canby, Redfield; Wytheville, Shriver. *North Carolina.*—Porter, Curtis, Carey, Vasey; Mitchell Co., Redfield; Macon Co., Highlands, J. D. Smith; Rich Mts., Transylvania Co., J. D. Smith. *South Carolina.*—Nuttall; Cæsar's Head, J. D. Smith. *Tennessee.*—Warmsprings, Rugel; Cumberland River, Nashville, Canby; Roan Mt., Dr. and Mrs. Britton; Mountains, Gattinger. *Kentucky.*—Lexington, Short; Banks of Kentucky River, Peter. Glabrous forms. *South Carolina.*—Bridal Vail Falls, J. D. Smith. *Georgia.*—Tococa Falls, Curtiss, No. 860.

The specimen on which *H. Curtisii* was founded does not appear to exist in either the Torrey or the Gray Herbarium.

** Inflorescence cymose-subspicate.

5. H. MINUTIFLORA, Hemsley, Diag. Pl. Nov. pars iii. p. 50, (1880).

"Stems, often bearing three or four leaves, 1° to 1½° high, villous below, as are also the petioles; leaves round-cordate, 1′ to 2′ broad, somewhat lobed, crenate-denticulate, 7 nerved, smoothish on both sides; calyx at time of flowering about 1″ long, rather broadly campanulate, lobes oblong, obtuse; petals linear, hardly longer than calyx lobes; stamens included at first, but at length slightly exserted."

South Mexico.—Popocatapetl, H. Christy, (fide Hemsley).

*** Inflorescence a long, narrow panicle; flowers clustered.

6. H. PILOSISSIMA, Fisch. and Mey., in Ind. Sem. h. Petrop. v. 36, (1838).

H. hispida, Hook. and Arn. Bot. Beechey, 347, (1841); not of Pursh.

H. hirtiflora, Torr. and Gray, Fl. N. A., i. 582, (1840).

Villous with rusty, viscid hairs; stems, usually bearing a few leaves, 1° to 2° high; root-leaves rough, 2′ to 3′ wide, broadly ovate-cordate, lobes rather obtuse, crenate-dentate; calyx at time of flowering short and broad, open, about 1½″ long, densely hairy; petals narrowly spatulate, hardly longer than calyx lobes; stamens very slightly exserted.

California.—Douglas, Coulter, No. 182, Kellogg and Harford, No. 245; Big River, Mendocino City, Bolander, No. 4,830.

Var. HARTWEGI, Watson, in Herb. Gray.

Panicle loose and more open; stems 2° to 3° high; the entire plant, but especially the calyx, less hairy.

California.—Hartweg. No. 1,742; Clark's Creek, S. Luis Obispo, Palmer, No. 124; Mendocino Co., Bolander, with 4,830 and=4,820; Santa Lucia Mts., Brandegee, Vasey, No. 173.

This plant seems to stand between *H. micrantha* and *H. pilosissima*, often much resembling the former in its foliage as well as in the shape of its panicle.

†† Flowering calyx 1½″ to 3″ long.

* Inflorescence a large, densely flowered, narrow thyrsus.

7. H. MAXIMA, Greene, Bull. Calif. Acad. Sci. ii. p. 149, (1886).

Stout leafy peduncles and equally long petioles villous, or hirsute and glandular, arising from brown, ½′ thick, decumbent stems, rough with the persistent bases of former leaves; leaves large, round-cordate to broadly-ovate cordate, 3′ to 6′ broad, obtusely 5 to 9-lobed, lobes crenate-dentate, the teeth bristle-pointed, ciliate; calyx at time of flowering rather short-campanulate, somewhat acute at base, minutely glandular, 2″ to 3″ long, lobes obtuse, pubescent; petals 1″ to 1½″ long, lanceolate with a prominent central vein; stamens slightly exserted.

Island Santa Cruz, Coast of California, Greene.

** Inflorescence paniculate or cymose-paniculate.

8. H. AMERICANA, L. Spec. Pl. i. 226, (1753).

H. scapigera, Mœnch, Meth. 674, (1794).
H. cortusa, Michx. Fl. i. 171, (1803).
H. viscida, Pursh, Fl. i. 187, (1814).
H. foliosa, Raf., fide spec. Herb. Torr.
H. reniformis, Raf. in Herb. Phil. Acad.

Stems more or less glandular-hirsute, 2° to 3° high, naked, or bearing a few small leaves; root-leaves 3′ to 4′ broad, ovate-cordate, with 7 or 9 rounded, crenate-dentate lobes, the older leaves usually with short, scattered hairs on the upper surface; calyx at time of flowering broadly campanulate, open, 1½″ to 3″ long, minutely glandular; petals very small, usually not projecting beyond calyx lobes; stamens much exserted.

Ontario.--Amherstburg, Macoun. *Connecticut.*—Wheelock. *New Jersey.*—Beck; Princeton, Torrey; Hudson Co, D. C. Eaton. *Pennsylvania.*—Near Philadelphia, Redfield; Chester Co., Canby; Easton, Schweinitz. *Delaware.*—Wilmington, Canby. *Washington, D.C.*—Vasey, Ward. *Virginia.*—Harper's Ferry, Porter; Wytheville, Shriver; Bedford Co., Curtiss; Lexington, "Potomak," Rafinesque, in Torr. Herb. (*H. foliosa.*) *North Carolina.*—Buncombe Co., Turkey Creek, near Morganton, Canby; Mts., Vasey, Croom; Bethany and Salem, Schweinitz. *Alabama.*—Buckley. *Louisiana.*—Red River, Hale. *Tennessee.*—Nashville, Gattinger. *Kentucky.*—Short. *Indiana.*—M. S. Coulter.

9. H. LONGIPETALA, Ser., in DC. Prodr. iv. 52, (1830).

Stems, 1° to 1½° high, usually bearing a few small bracts, slightly villous; petioles villous with rusty hairs; leaves broadly ovate-cordate, 2′ to 3′ broad, slightly 5 to 9-lobed, lobes aristate-dentate, margin finely ciliate; calyx at time of flowering about 2″ long, narrowly campanulate, glandular-pubescent, lobes half as long as entire calyx, unequal; petals linear, about twice as long as calyx lobes.

Mexico.—Regla, Halsted, (ex. descrip.); South Mexico, in Mountains above Toluca, (Andrieux, No. 356, fide Hemsley).

10. H. ORIZABENSIS, Hemsley, Diag. Pl. Nov. pars. iii. 50, (1880).

Villous with rusty spreading hairs, especially the 4′ to 8′ long petioles; stems 1° to 2° high, usually bearing one or two small leaves or laciniate bracts; lower leaves round-cordate, 2′ to 3′ broad, the larger veins villous underneath, the upper surface almost glabrous, slightly and rather obtusely 5 or 7-lobed, lobes crenate, aristate-dentate, margin ciliate; calyx at time of flowering campanulate, glandular-pubescent, about 2″ long; petals linear, about twice as long as calyx lobes; stamens conspicuously exserted.

Mexico.—Sierra de Agua, Müller, (ex descrip.). Peak of Orizaba, (Linden, No. 577, Galeotti, No. 2,835, fide Hemsley).

11. H. RUBESCENS, Torr. Sitgr. Rep., 160, (1854).

Stems, often bearing one or two small leaves or a few bracts, 1° to 18′ high, minutely glandular; petioles slightly villous, or sometimes almost glabrous; root-leaves round-cordate, sub-cordate or truncate, 1′ to 2′ broad, lobes indistinct, crenate-dentate; calyx at time of flowering rather narrowly campanulate, 2″ to 3″ long, minutely glandular at base, lobes somewhat tinged with red, pubescent; petals linear-spatulate, about twice as long as calyx lobes; stamens occasionally only slightly, but usually conspicuously, exserted.

Mexico.—San Luis Potosi, Schaffner, No. 71, (distrib. as *H. Mexicana*); Parry and Palmer, No. 231. *Texas.*—Chicos Mts., Havard, No. 39. *New Mexico.*—Wright, No. 1,097; Organ Mts., Vasey., Sitgreave's Exp. (type). *Arizona.*—Mt. Graham, Rothrock, No. 411; Mt. Agassiz, Rusby; Santa Rita Mts., Pringle. *Utah.*—Wahsatch Mts., Watson, No. 366; Parry, Nos. 12 and 61; Ogden, Hayden; Stansbury's Island, Stansbury's Exp; Kanab, Mrs. A. P. Thompson; near Great Salt Lake, Porter; Beaver City, Palmer, No. 149. *Nevada*—E. Humboldt Mts., Watson, No. 366. *California.*—Brewer, Nos. 1,759 and 2,101, Lemmon, No. 1,093, Greene, No. 413, Kellogg, Bolander, No. 4,935; Castle Lake, Pringle; Plumas Co., Mrs. Austin; San Bernadino Mts., Parish; Yosemite Valley and Mts., Torrey, No. 152, Bolander, No. 4,935. *Oregon.*—Stein's Mt., Cusick, No. 1,260.

Var. NANA, Gray, Pl. Wright, ii. 64, (1853).

Flowers smaller, stems 6′ to 10′ high.

Arizona.—"Rim Rock," Tonto Basin, Mearns, No. 138; Mexican Boundary Survey, Santa Rita del Cobra, Bigelow, No. 406a. *New Mexico*, Wright.

Var. OREGONENSIS, n. var.

Stems 8′ to 16′ high; calyx broadly campanulate and open, very variable in size, lobes short and obtuse, glandular to glandular-pubescent; styles shorter and more subulate; stamens and styles included at first, at length slightly exserted.

Oregon.—Stein's Mt.; Harney Valley; Siskiyou Mts., Thos. Howell, No. 689. A specimen collected by Mr. Parish on the San Bernadino Mts. in S. Calif., No. 1,820, seems to be an intermediate form, also one from Yosemite, Meehan.

*** Inflorescence glomerate-spicate, often secund.

12. H. BRACTEATA, (Torr.) Seringe in DC. Prodr., iv. 52, (1830).
Tiarella (?) *bracteata*, Torr. Ann. Lyc. N. Y., ii. 204, (1827).
Oreotrys bracteata, Raf. Fl. Tellur. ii. 74, (1836).

Small, stems usually several, 3′ to 8′ high, minutely glandular, naked or bearing two or three small leaves; root-leaves roundish, ½′ to 1½′ broad, subcordate, incisely lobed, lobes crenate-dentate; calyx at time of flowering campanulate, about 2″ long, minutely glandular; petals filiform, only a little longer than calyx lobes; stamens not exserted at first, but slightly exserted later.

Colorado.—Parry, No. 172, Greene; Georgetown, Patterson, No. 31; Denver to Idaho City, Porter; Rocky Mts., Hall and Harbour, No. 205, (in part); Grand Lake, Vasey, No. 217; James, (type of *Tiarella bracteata*); Gray's Peak. *Nevada.*—Empire City, Gray.

††† Flowering calyx 3″ to 5″ long.

* Inflorescence an open, spreading panicle.

13. H. PUBESCENS, Pursh, i. 187, (1814).

H. pulverulenta and *reniformis*, Raf. Med. Fl. i. 243 and 244, (1828).

H. ribifolia, Fisch. and Lall. in Ind. Sem. h. Petrop. 8, 62, (1841).

Stems, usually bearing one or two small leaves, 1° to 3° high, densely glandular, at least above; root-leaves round-cordate, 2′ to 4′ broad, slightly 5 or 7 lobed, veins prominent; calyx at time of flowering oblong-campanulate, somewhat oblique, 3″ to 4″ long, minutely glandular, lobes often unequal; petals broadly spatulate, veined, a little longer than calyx lobes; stamens hardly exserted, the anthers being on a level with the tips of the calyx lobes, sometimes, however, slightly exserted.

Pennsylvania.—Lancaster Co., Small; Birmingham, Miss Davis; near Schuylkill River, Canby; Banks of Susquehanna, Porter; Warriorsmark, Lowrie; Reading, Herb. Phil. Acad. *Maryland.*—Alleghanies, Rafinesque (*H. grandiflora*, Raf. in Herb. Torr.) *Virginia.*—Daubeny, Hot Springs, Curtiss. *North Carolina.*—Vasey; Hick. Nut Gap, Curtiss, Asheville, Thos. Hogg. *Kentucky.*—Rafinesque, (*H. reniformis*, Raf. in Herb. Gray); Bath, Short.

** Inflorescence a narrow panicle.

14. H. HISPIDA, Pursh, i. 188, (1814).

H. Richardsonii, R. Br., Frankl. Journ., 766, t. 29, (1823).

H. lucida, Schlecht., Ind. Sem. h. Hal. 8, (1848).

Stems, usually leafless, 2° to 4° high, hirsute, as are also the petioles, with pale spreading hairs, and above minutely glandular; leaves round-cordate to broadly ovate-cordate, 2′ to 3′ broad; calyx at time of flowering campanulate, conspicuously oblique, 3″ to 5″ long, lobes unequal; petals small, spatulate, a little longer than calyx lobes; stamens soon exserted, often becoming longer than the petals.

Virginia.—Gray. *Michigan.*—Kalamazoo, Tuthill. *Illinois.*—Babcock; Augusta, S. B. Mead; near Oquawka, Patterson; Ringwood, Vasey; Marion Co., Bebb; Winnebago Co., Bebb; Athens, E. Hall. *Wisconsin.*—Madison, S. H. Watson, Hale. *Iowa.*—Decorah, Collett. *Minnesota.*—Basswood Lake, Arthur, No. 431 (B.) *Dakota.*—Box Elder Creek, W. S. Rusby. *Montana*—Park Co., Tweedy, No. 259; Bozeman Pass, Canby, No. 116, (distrib. as *H. cylindrica*). *Idaho.*—Allen. *British America.*—Hooker; English River, Kennicott; Lake Superior, Macoun; Lake Winnepeg, (Dr. Gunn, in Herb. Torrey); Lake Winnepeg Valley, Bourgeau; Saskatchawan, Bourgeau; Assiniboia, Sourie Plains, Macoun, No. 733; Rocky Mts., Kananaskis, Macoun; Lake Shebandedwan, Ontario, Macoun.

Var. HIRSUTICAULIS, n. var.

Hirsute; stems for their entire length, as well as petioles and larger veins on lower surface of leaves, thickly beset with white or slightly yellowish spreading hairs; stems 1° to 2° high, naked, or bearing one or two very small leaves or laciniate bracts; root leaves round-cordate with a broad and deep sinus at base, 1′ to 3′ broad, with 5 or 7 obtuse lobes, lobes crenate-apiculate, margin ciliate, upper surface glaucous, or nearly so, lower surface pale; calyx at time of flowering campanulate, rather short and broad, about 2″ long, very slightly, if at all, oblique, minutely glandular, parted almost half way down, lobes somewhat unequal, obtuse, green, base of calyx often brownish; petals small, spatulate, green, looking like smaller calyx lobes, and like them minutely glandular, not projecting beyond calyx lobes; stamens much exserted; seeds numerous, about ¼″ long, dark brown, muricate, oblong, curved, triangular in section.

Missouri.—St. Louis, Engelmann; Louisiana, Pech.

This plant differs from *H. hispida* mainly in having an open, spreading panicle, and much smaller flowers. It may, perhaps, be a distinct species, but as there appear to be intermediate forms, it would seem best, for the present at least, to consider it a variety.

§ 2. Stamens always included.

† Flowering calyx 1″–2″ long.

‡ Flowering calyx campanulate.

* Inflorescence a long, narrow, racemose-panicle.

15. H. NOVA-MEXICANA, n. spec.

Stems 1° to 2° high, usually bearing a few small laciniate bracts, glandular-puberulent or pubescent, or even slightly villous, especially at the base and in the case of the younger stems, with short, scattered, pale, yellowish hairs; petioles 1′ to 3′ long, not slender, often grooved or fluted, villous with short yellowish hairs which are continued upon the larger veins on the lower surface of the leaves; leaves thin, sometimes purplish underneath when dried, 1′ to 2′ broad, round-cordate with a deep but usually rather narrow sinus at base, hardly lobed, crenate, mucronate-dentate, margin ciliate, upper surface glaucous, or that of the younger leaves pubescent; calyx at time of flowering short campanulate, broad, open, 1″ to 1 ½″ long, lobes short and obtuse, pulverulent, the base of the calyx, often chocolate-brown in color, becoming somewhat globose in fruit; petals minute, linear, not longer than calyx lobes; seeds numerous, about ¼″ long, muricate, oblong, almost straight. In one specimen examined (No. 1098 below) eight stamens were found, two of them arising from the same base.

New Mexico.—Wright, No. 1098; Copper mines, Bigelow, Mex. Bound. Survey, No. 407; Pinos Altos Mts., Greene.

** Inflorescence a short racemose-panicle.

16. H. HALLII, Gray, Proc. Acad. Phil. 62. (1863).

Glandular-puberulent; stems 4′ to 8′ high, naked, or bearing a few subulate bracts; leaves round-cordate or sub-cordate, ½′ to 1′ broad, slightly 5 lobed, lobes crenate-dentate; calyx at time of flowering 1 ½″ to 2″ long, minutely glandular or glandular-pubescent; petals narrowly spatulate with a long slender claw, almost twice as long as calyx lobes.

Colorado.—Georgetown, Jones, No. 499 (distrib. as *H. bracteata*); Grand Cañon of the Arkansas, Brandegee; Upper Arkansas, Porter; Pike's Peak, Sheldon, No. 319, Letterman, No. 27, Canby; Rocky Mts., Hall and Harbour, No. 205 (in part) (type); Greenhorn Mts., Greene. *Idaho.*—Ramshorn Mt., a glabrous form, Newberry.

‡‡ Flowering calyx almost rotate, limb flat, dilated.

17. H. PARVIFOLIA, Nutt., Torr. and Gray Fl., i., 581. (1840).

Glandular-puberulent; stems 6′ to 2° high, usually naked; leaves round-cordate, or occasionally reniform, ½′ to 2′ broad, crenately 5 or 7 lobed; calyx at time of flowering 1″ to 1½″ long, obconical, minutely glandular, lobes short, almost triangular; petals small, broadly spatulate or obovate with a very short claw, usually a little longer than calyx lobes.

New Mexico.—Fendler, No. 264; Santa Fe, Rothrock, No. 61; Santa Magdalena Mts., Vasey. *Arizona.*—Palmer. *Colorado.*—Wolf and Rothrock, Nos. 804 and 805, Parry, No. 173, Vasey, No. 218 and 219, Greene; Gray's Peak, Patterson, No. 32, Gray and Hooker; Lake City, Pease; Chian Cañon and Ute Pass, Porter; Georgetown, Jones, No. 452 (distrib. as *H. Hallii*); South Park, Coulter; Pike's Peak, Rocky Mts., Parry, Nos. 173 and 174, Thomas, Hall and Harbour, No. 204. *Utah.* —Ogden; Wahsatch Mts., Hayden, Watson, No. 368; Bear Valley, Palmer, No. 150. *Nevada.*—Shockley, No. 249. *Wyoming.*— Yellowstone Lake, Hayden; Laramie Plains, Sheldon, No. 88; Yellowstone Park, Tweedy, No. 246; Fort Bridger, Leidy, No. 61. *Oregon.*—Nuttall (type). *Montana.*—Shield's River, Scribner, No. 52a. *British America.*—Cypress Hills, Macoun, No. 54; Milk River Ridge, N. W. T., Havard, Dawson, No. 732.

Alpine specimens of this species are smaller, with a shorter and more compact panicle.

†† Flowering calyx 2″–5″ long.
* Inflorescence a loose, few-flowered raceme.

18. H. RACEMOSA, Watson, Proc. Amer. Acad. xx. 365, (1885).

Glandular-pubescent; stems 4′ to 10′ high, bearing 2 or 3 comparatively large petiolate leaves; leaves reniform to reniform-cordate, crenately lobed and toothed, 1′ to 2′ broad, the younger leaves pubescent along the larger veins on the lower surface, and beset with short scattered hairs on the upper surface, in some plants the older leaves almost glabrous on both surfaces; calyx at time of flowering broadly campanulate, 2″ to 3″ long, glandular-puberulent or pubescent; petals linear-spatulate, occasionally more or less laciniately toothed toward the top, but little longer than calyx lobes.

Washington.—Mount Paddo (Adams) Suksdorf; Mts. north of Ellensburgh, Brandegee, No. 765; Cascade Mts., Brandegee, No. 305 (distributed as "*H. cylindrica*, small form").

19. H. WILLIAMSII, Eaton, Bot. Gazette, xv. 62, (1890).

Stems naked, slender, 1° to 2° high, glandular-puberulent leaves 4 to 7, in a cluster at base of stem, round-cordate, 1′ to 1½ broad, hardly lobed, crenate with a ciliate margin, glaucous, lower surface often somewhat purple in the dried specimens; petioles 1′ to 3′ long, slender; calyx at time of flowering obconical, acute at base, minutely glandular, 2″ to 3″ long, 1″ to 1½″ broad; petals caducous, broadly spatulate with a long slender claw, usually 2 to 3 times as long as calyx lobes, in some specimens even longer.

Montana.—R. S. Williams, No. 179 (type); near Jefferson City and Bozeman, Scribner, No. 52b; Nevada Creek, Canby, No. 119; Beaver Head Co., Tweedy, No. 39 (distributed as *Tellima pentandra*). *Wyoming.*—Yellowstone Park, Tweedy, No. 846, Chas. H. Hall.

** Inflorescence thyrsoid.

20. H. SANGUINEA, Engelm., in Wisliz. Rep. 23, (1848).

Stem slender, 1° to 18′ high, glandular-pubescent, naked, or bearing a few diminutive leaves; petioles 2′ to 4′ long, villous with soft, pale spreading hairs; root-leaves round-cordate, 1′ to 2′ broad, somewhat 5 or 7 lobed, lobes crenate-dentate, or almost serrate, margin ciliate; calyx at time of flowering red, campanulate, open, minutely glandular, about 4″ long; petals very short, less than 1″ long and inserted so low upon the calyx that their tips hardly project beyond the calyx-tube.

Mexico.—Chihuahua, Pringle, No. 1588. *New Mexico.*—Wright, No. 1096. *Arizona.*—South Catalina Mts., Pringle; Santa Rita Mts., Pringle; Sanoita Valley, Rothrock, No. 673; Camp Lowell, Parish, No. 86.

*** Inflorescence more or less spicate.

21. H. CYLINDRICA, Dougl., Hook. Fl. Bor. Am. i., 236, (1840).

Stem naked, 2° to 3° high, lower portion as well as petioles and larger veins on lower surface of leaves very villous or hirsute with spreading rusty hairs; petioles rather slender, 4′ to 1° long; leaves 1′ to 3′ broad, round-cordate, almost glabrous above, slightly 5 or 7 lobed, lobes obtuse, crenate, mucronate-dentate; calyx at time of flowering 3″ to 4″ long, campanulate, glandular and scabrous, somewhat oblique, deeply cleft; petals minute or none.

Oregon.—Nuttall, Elihu Hall, No. 160, "Hooker, dupl."

Herb. Gray; Clear Water, Spaulding; Portland, Howell; Cascade Mts., Newberry; Sumass Prairie, Lyall, Oregon Bound Commiss.; Columbia Woods, Nuttall, "*Holochloa elata.*" *Washington.*—Upper Columbia, U. S. Expl. Exp., No. 461; Falcon Valley, Suksdorf. *British Columbia.*—Fletcher. Vancouver's Island, Macoun.

Var. OVALIFOLIA (Nutt.)

H. ovalifolia, Nutt., in T. & G. Fl. i. 581, (1840).

Minutely glandular-pubescent; stems 8′ to 18′ high, naked, or bearing a few subulate bracts; leaves minutely viscid-pubescent on both sides, or occasionally almost glabrous, ½′ to 1½′ long, oval or roundish oval, usually truncate or even somewhat cuneiform at base, but occasionally slightly cordate, crenate or crenately incised, occasionally slightly lobed; calyx at time of flowering campanulate, pubescent, 3″ to 4″ long, lobes somewhat unequal; petals often wanting.

Nevada.—East Humboldt Mts., Jones. *Wyoming.*—Stinking Water, Parry, No. 99; Yellowstone Park, Tweedy, Platt, Hayden Survey (distrib. as *H. cylindrica*). *Idaho.*—Hayden's Exped. *Oregon.*—Blue Mts., Nuttall (type); Union Co., Cusick (a very large flowered form, calyx almost 6″ long). *Montana.*—Bannock, Watson, No. 137; Rocky Mts., S. of Va. City, Hayden. *Washington.*—North Fork Columbia River and Interior, U. S. Explor. Exped. *British America.*—Crow's Nest Pass, and near Kamloops, Dawson; Spencer's Bridge and Morley, Macoun.

Var. ALPINA, Watson, King's Rep., v. 96, (1871).

Glandular-pubescent; stem 6′ to 12′ high; leaves ¾′ to 1′ broad; spikes short, hardly more than 1′ long.

Nevada.—Clover Mts., Watson, No. 367 (type). *Oregon.*—Howell, R. D. Nevius. *Washington.*—Mt. Adams, Suksdorf, Nos. 14 and 26. *British Columbia.*—Kananaskis, Rocky Mts., Macoun; Crow's Nest Pass, Rocky Mts., Dawson.

Var. GLABELLA (Torr. & Gray);

H. glabella, Torr. & Gray, Fl. i. 581, (1840).

Almost glabrous, or slightly pulverulent-pubescent, destitute of spreading hairs; stem naked, 18′ to 2° high; leaves round-cordate to ovate-cordate, often thick and leathery, 1′ to 2′ broad, crenately lobed, veins prominent, lobes crenate, apiculate-dentate; calyx at time of flowering 3″ to 4″ long, campanulate, glandular-pubescent; petals minute or wanting.

Montana.—Judith Mts., Canby; Rattlesnake Canon, Watson, No. 137; Little Belt Mts., Scribner, No. 52; *Oregon.*—Nuttall, (type), Lt. Mullan; Blue Mts., Henderson. *Washington.*—Spokane Co., Suksdorf, No. 299; Cascade Mts., Yakima, Brandegee. *British America.*—Kootanie Pass, Rocky Mts., Dawson.

Var. TENUIFOLIA, n. var.

Glabrous, stem naked, 1° to 2° high; leaves thin, round-cordate, 1′ to 2′ broad, somewhat incisely 5 or 7 lobed, lobes crenate, aristate-dentate, margin minutely ciliate; petioles slender, 2′ to 4′ long; calyx at time of flowering 2″ to 3″ long, campanulate, open, minutely glandular, deeply cleft into somewhat unequal lobes; petals narrowly spatulate, becoming as long, or nearly as long, as the calyx lobes.

Oregon.—Near the Dalles, Thos. Howell (distrib. as *H. glabella*, Nutt.). *Washington.*—Sincoe Mts., J. Howell.

In addition to the specimens contained in the Columbia College Herbarium, those of Harvard College, the Academy of Natural Sciences of Philadelphia, the National Herbarium at Washington, the Geological Survey of Canada, Mr. Wm. M. Canby and Prof. Thos. C. Porter have been examined.

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 16.

New or Noteworthy North American Phanerogams.—III.

BY N. L. BRITTON.

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New or Noteworthy North American Phanerogams.—III.

BY N. L. BRITTON.

RANUNCULUS PORTERI, n. sp. § Batrachium. Submersed, apparently several feet long, freely branching. Leaves petioled, the petioles ½′ to 1′ long, and dilated at the base, the blade about 1½′ in diameter repeatedly ternately divided into linear or capillary segments; the upper shorter and broader; flowers white, 3″ to 4″ broad, peduncled; achenes 6 to 12 in a head, obliquely oval, compressed, somewhat pubescent, marginless, very nearly 1″ long, beakless or with a mere apiculation, irregularly rugose transversely; receptacle pubescent.

I noticed this plant in Dr. Porter's Herbarium a year or so ago. The accompanying label has only "Henry's Fork, No. 1062; *Ranunculus*, entirely immersed." It was collected on the Hayden Survey of the territories, but I cannot place the exact locality.

The species differs from any form of *R. aquatilis* with which I am acquainted, in its much broader and fewer leaf-segments and larger achenia. I sent it to Mr. Baker at Kew, who thinks it not related to any European form of that plant, remarking that "no European form ever shows so much transition between floating leaves and capillary leaves as this does." Its affinity with *R. aquatilis* is evident, however, from its beakless, rugose pubescent achenia and hairy receptacle.

I refer here, with considerable hesitation, the plant collected by Professor Greene at Ione, Cal., June 7, 1889, and the species may occur in British Columbia.

Capsella procumbens (L.), Fr. Mant. Nov. Fl. Suec. i. 14 (1832). Reichenb. Ic. Flor. Germ. et. Helv. ii. t. xi. f. 4221 (1837).

Lepidium procumbens, L. Sp. Pl. 643 (1753).

Hutchinsia procumbens, D.C. Prodr. i. 178 (1818).

Capsella elliptica, C. A. Meyer, Verzeich. Pflanz. Cauc. 194 (1831).

Hymenolobus divaricatus and *H. erectus*, Nutt. in T. & G. Fl. N. A. i. 117 (1838).

Capsella divaricata, Walp. Rep. i. 175 (1842).

I was first led to investigate the relations of the Old and New World plants which have been described under the above-cited names from finding them all united in the Kew Herbarium. An examination of the specimens there preserved and subsequent study of an extensive suite at home have convinced me that they are all one species, adding another to the list of circumboreal plants. In Europe it extends south to the Mediterranean region, in Asia to Thibet, and it apparently occurs also in Australia. On our own continent it has been found in Labrador by Mr. J. A. Allen (along the seashore, Dead Islands, lat, 52° 48′) and it is widely distributed over the far west as far south as Utah and Lower California.

Hypericum Canadense, L. var. *majus*, Gray Man. Ed. 5, 86 (1867).

A study of this plant in the field and herbarium leads me to think that it has good claim to specific rank. Its characters of lanceolate, acute, 5 to 7-nerved leaves, greater size and longer and sharper calyx-lobes seem quite constant. I have not seen it growing with the typical *H. Canadense*. If they could be found together, important evidence might be obtained. I do not propose here to elevate it to specific rank, but only to call attention to it in the hope that it may be investigated. Its range is given by Prof. Coulter (Bot. Gaz. xi. 110) as "Canada to Pennsylvania, Illinois and about the Great Lakes," but by Watson and Coulter in the 6th edition of Gray's Manual "L. Superior, Robbins, S. New York and southward." These are contradictory. Specimens from Vermont, New Jersey, Illinois and Iowa are preserved in the Columbia Herbarium.

Calandrinia pygmæa, A. Gray, Proc. Amer. Ac. viii. 623 (1873).

Talinum pygmæum, A. Gray, Amer. Journ. Sci. xxxiii. 407 (1862).

There is an Australian species so named by F. Mueller in Fragm. Phytog. Austr. i. 175 (1858) and recognized by Bentham in Flora Australiensis. I would therefore propose for the American plant the name C. GRAYI.

Crotalaria retusa, L., was collected by Mr. Blodgett on Key West, Florida, many years ago. It does not appear to have been reported from the United States before, but might be expected, as it grows throughout tropical America.

LOTUS HELLERI, n. sp. (*Hosackia Purshiana*, Torr. & Gray, Fl. N. A. i. 327 in part). Erect, annual, divaricately branching 1° to 2° high, finely pubescent or glabrous, leafy; branches ascending, 6′ to 8′ long, slender; stipules; leaves sessile, 3-foliolate; leaflets linear or linear-oblong, acute, entire, the terminal one slightly longer stalked than the lateral ones which are somewhat inequilateral; peduncles 1-flowered, axillary, slender, about 8″ long in fruit, leafy-bracted at the summit; keel yellowish about 3″ long; wings yellowish, tinged with pink; standard pale pink; calyx lobes linear, equalling or slightly exceeding the tube; pod linear, glabrous, 1′ to 1¼′ long, 1½″ wide, acute, 5 to 6-seeded, deflexed at maturity.

North Carolina (Schweinitz) Mecklenberg Co. (M. A. Curtis) Salisbury, Rowan Co. (A. A. Heller). Named in commemoration of Mr. Heller's recent collecting trip in North Carolina, on which a number of rare and interesting plants were obtained. *Lotus Americanus*, (Nutt.) Bisch. Litt. Ber. Linnæa, 1840, 132, (*Hosackia Purshiana*, Benth.), with which this has been confounded, has larger and broader leaflets, is more villous, and has the calyx more deeply cleft. I believe that it has not been found east of the Mississippi, but ranges from Minnesota to Sonora. The widely distributed plant of the Pacific Coast, also mixed up with *Lotus Americanus*, appears to me quite distinct, as Nuttall made out, describing it as *Hosackia elata* (In T. & G. Fl. N. A. i. 327) and there may be, as he also thought, several other closely related species in California and the Northwest.

Psoralea Reverchoni, S. Wats., Proc. Amer. Acad. xxi. 449, originally described from specimens collected by Mr. Reverchon in western Texas, in 1877, was also found by Dr. Palmer in the Indian Territory, 1868 (No. 72).

Psoralea corylifolia, L. is in Dr. Chapman's Herbarium, ticketed "Appalachicola, introduced." It is an Asiatic species, close to *P. dentata*, DC. of southern Europe.

Cassia crotolarioides, Kunth, var. *leucophylla*, Benth. There is a specimen so determined in the Kew Herbarium, collected by Prof. Mosely in the Grand Canon, Colorado Plateau, Arizona, 1884. The species is known in north Mexico, and its occurrence in this region might have been expected.

Ilex montana, T. and G. var. MOLLIS (A. Gray). *Ilex mollis*, A. Gray, Man. Ed. 2. Leaves as in the type, but pubescent beneath. Burgoon's Gap, Penn. (Porter). Pocono Plateau, Penn., collected by myself on the Torrey Club Field Excursion, June 7–10, 1889.

This plant was first referred to *Ilex dubia* (Don.), B. S. P. Prel. Cat. N. Y., but on comparison with typical specimens of this species from the Alleghanies of North Carolina, Georgia and Alabama, it appears hardly possible that this disposition of it is correct. *I. dubia* has broadly ovate, oval or even obovate leaves, which are rarely acuminate and commonly obtuse, and are much more densely and softly pubescent beneath.

Ilex mollis was founded on the Pennsylvania plant, and the southern species subsequently referred to it. I am maintaining *dubia* as the specific name of the latter on the authority of Dr. Gray, who probably saw a type of it. But from Don's description of *Prinos dubius*, (Gard. Dict. ii. 20), this would not be certain, and he says it occurs from New Jersey to Carolina, while the plant which I know as *dubia* is not reported north of North Carolina.

Ilex verticillata (L.) A. Gray, var. *tenuifolia*, Torr. Fl. North. States, 338 (1824). This variety with thin, obovate leaves, glabrous, except a slight pubescence along the midvein on the under surface, and with mucronate-tipped, appressed teeth, originally collected by Dr. Torrey in the cedar swamp at New Durham, has recently been collected by Mr. W. M. Whitfield at Mt. Washington, Berkshire Co., Mass.

Var. *padifolia* (Willd.), T. and G. in S. Wats. Bibliog. Index, i. 220, is distinguished from the type by its smaller, thicker (almost coriaceous), broadly oval or nearly orbicular leaves. The original specimen in Herb. Torrey came from Lake Erie. The plant is common on the Pocono Plateau of Pennsylvania.

Professor Trelease, in his review of North American species of *Ilex* in Trans. St. Louis Acad. Sci. Vol. V., does not recognize either of these varieties, but they appear to me certainly well-marked enough to warrant consideration.

SPIRÆA VIRGINIANA, n. sp. A glabrous shrub, the branches forming long wands, erect or reclining, 1°–4° long. Leaves oblong or slightly oblanceolate, thin, obtuse or short-pointed at the apex, rounded or cuneate at the base, 1½′–2′ long, 5″–8″ wide, green above, pale beneath, entire or with a few low serrations in the upper half; petioles 2″ long; pedicels and peduncles pale and glaucous; flowers about 2″ broad, in terminal compound corymbs 1′-3′ across; calyx teeth 5, triangular, blunt, about the length of the short-campanulate tube, distinctly glaucous; petals 5, white, ovate-orbicular, obtuse, stamens 15–20, persistent; styles 5–6; follicles in the specimens examined 5–6, apparently sterile, included in the persistent calyx.

On damp rocks along the Monongahela River, Morgantown, West Virginia, collected by Dr. C. F. Millspaugh in flower, June 20th, 1890, and in apparently imperfect fruit late in September. Collected also by Mr. G. R. Vasey in the mountains of North Carolina, 1878.

Spiræa betulæfolia, Pall. and *S. corymbosa*, Raf., have much longer follicles exserted beyond the calyx, broader, thicker and dentate leaves, and are different in habit. Rafinesque published a number of species in his New Flora, but none of them can apply to this one.

LUDWIGIA ALTERNIFOLIA, L., var. LINEARIFOLIA, n. var. Two or three feet high, divergently branched, the branches ascending. Leaves linear, elongated, 2′–4′ long, 1½″–4″ wide, acute; flowers solitary in the axils of the upper leaves or bracts, yellow; sepals ovate-lanceolate acute, narrower than those of *L. alternifolia*; branches and both sides of the leaves somewhat pubescent. Petals apparently remaining on the plant longer than those of *L. alternifolia*, which, as Dr. Millspaugh observes, commonly fall away when the plant is shocked.

Appearing very distinct from typical *L. alternifolia*, but presumably but a variety of it. From the description it may be the *Rhexia linearifolia*, Poir. in Lam. Encycl. vi. 2, said to come from Carolina.

Leontodon hirtus, L., long known from the ballast grounds of the eastern seaports, is becoming more widely adventive. It has recently been collected in Southern New Jersey by Dr. J. E. Peters, at Cold Spring Harbor, Long Island, by Mr. Geo. D. Hulst, and on Vancouver Island, British Columbia, by Prof. Macoun. It certainly claims recognition as an adventive plant.

Populus heterophylla, L. Another locality for this rare tree in the Middle States has been discovered by Rev. L. H. Lighthipe, near Woodbridge, Middlesex Co., N. J. The stations now known for it at the north, besides those given in my "Catalogue of Plants from New Jersey," and its somewhat wide distribution on Staten Island, are Northport, Long Island, and Guilford, Conn., as recorded by Professor Sargent in his Forestry Report in the Tenth Census.

Eriocaulon Körnicikanum, Van Heurck et Muell. Arg. Obs. Bot. 101 (1870). This species does not appear to have been alluded to by any American author. I know nothing more about it than the description given by the above named authors. The plant was collected in eastern Texas by Chas. Wright, and is mentioned here only to call it to the attention of our botanists. It can hardly be Drummond's No. 409 (second coll.), which I take to be *E. Benthami*, Kunth., although without sufficient examination to warrant certainty.

Cyperus phæocephalus, Griseb. Plant, Lorentz. 216 (1874), may be reported from mountains between Mazatlan and Durango, Mexico, collected by Mr. Forrer in 1887. Specimens were sent me by Prof. Greene. It occurs along the Andes of South America from Ecuador to Argentina. (Spruce, 5,904; Mandon, 1,394; Rusby, 100).

CYPERUS BLODGETTII, n. sp. Section Mariscus. Perennial, from a tuberous thickened base, 8′-9′ high. Roots fibrous; leaves linear, 3′-4′ long, about 1″ wide, glabrous, smooth on the edges; culm sharply triangular; involucre of about three leaves, 1′-2½′ long; inflorescence of 1-3 dense globose heads, 5″-8″ in diameter; spikelets 20-40, 6-10-flowered, the lowest glume empty, the others fertile; glumes keeled, oval or ovate, obtusish, strongly about 9-nerved, about ½″ long; achenium oblong, about two-thirds the length of the glume, triangular; falling away with the glumes from the rachis at maturity; rachis strongly scarred with the bases of the flowers; stamens three?

Key West, Mr. Blodgett (Herb. Torrey and Herb. Gray).

I went over this species with Mr. Clarke at Kew in 1888 and we decided that it must be new. Mr. Clarke, maintaining that *Mariscus* is distinct as a genus from *Cyperus*, proposed calling it *M. avenicola*, and if this view is to be adopted, the plant may bear this name. But I have not been able to agree with him in this respect. The species appears nearest to *C. Grayii.*

CONTRIBUTIONS FROM THE HERBARIA OF
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The Flora of the Desert of Atacama.

BY THOS. MORONG.

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The Flora of the Desert of Atacama.

By Thos. Morong.

Under the old geographical limits, before Chile had appropriated as a war indemnity the whole of Bolivia's seacoast and three degrees of Peruvian soil, the desert of Atacama was figured as extending from Coquimbo on the south to Bolivia on the north and eastward from the Pacific Ocean to the Andes, being nearly coincident with the province of the same name in Chile. So far, however, as the natural features are concerned, the name might well be applied to the entire region lying between Valparaiso and Ecquador, for it is all a desert broken only by lofty mountain peaks and deep valleys, the beds of ancient rivers, and watered here and there by scanty streams derived from the melting of the snows upon the high Cordilleras. The water from this source is carefully husbanded by the inhabitants of the valleys, and used in irrigation for agricultural purposes. Very little of it goes to produce the flora referred to in this article, by far the greater part of which belongs exclusively to the desert proper.

It seems like a contradiction in terms to speak of a *desert* vegetation, and especially one upon a territory so bleak and desolate as the Atacama, which is distinguished by the number of its hideously barren hills of rock and its sandy wastes. And yet this desert bears a flora quite extensive in the number of its species and very peculiar and interesting in its character. Over 500 species of plants have been gathered within its borders, and probably as many more might be detected upon a close research. One naturally wonders by what chance such a flora can be brought into existence and how it can live after being once started. In explanation it must be said that this region is not absolutely rainless, although it is nearly so. There is an occasional winter rain, or rarely two or three showers in the course of a winter, occurring at long intervals. Generally such rains are barely enough to moisten the ground, but that little is sufficient to cause the seeds, which are lying dormant in the sand or the bulbs beneath the ground, to germinate. Once up the seedling is kept alive by the dews which fall nightly upon the earth, and by the mists that hang around the hills every morning in the winter and spring-time. In this way these growths obtain moisture enough to enable them to reach maturity. Besides this the Atacaman plants have acquired several peculiarities which admirably adapt them to their conditions of life. One of these lies in the power of the seeds to live for many years in the dry sand without germinating. They have been known to retain their vitality for ten years and then to sprout at the touch of rain.

I suspected from appearances that a special weather protection existed in many or all of these seeds, and Dr. Gregory of Barnard College, who has, at my request, kindly examined microscopic sections of a number of species, confirms my suspicions so far as these particular species are concerned. The seeds in every case proved to have unusually thick walls and a copious supply of albumen around the embryo. In one instance (*Pintoa*) she reports that the "seed coats are heavy, the outer one having peculiar shaped cells which turn to mucilage on coming into contact with water." Another (a *Tristagma*) has "copious albumen and the outer walls are thickened and turned in color to a dark brown, making an extremely hard coat." *Calandrinia* seeds presented a coating "somewhat heavy, but with a peculiar readiness to break on contact with water." *Cristaria* has an integument of several layers which together make a thick wall, and the interior albuminous. *Viola* shows in the seed coat a contrivance similar to that of *Pintoa*, with more or less of albumen in the interior.

While seeds are thus fortified against a protracted drought, tubers and bulbs are equally well equipped by the large amount of water or milk which they store up. I found many of the bulbs that I collected so full of juice that I could squeeze it out in a stream by hand.

Another peculiarity of the herbaceous flora, evidently acquired, is the early age at which the plants begin to flower and fructify. As if aware that they have only an ephemeral life and that what they have to do must be done quickly, they are scarcely above ground before they put forth blossoms. Many species may be seen in flower when hardly an inch in height, and which go on flowering until they reach the stature of two or three feet—if they can survive so long. I was continually deceived by this habit, naturally supposing that these wee things must be different in species from plants that I had seen elsewhere only as tall and robust when in flower. A little more experience, however, convinced me that these Liliputians were merely taking time by the forelock.

Still another adaptation, excited apparently by the conditions under which they exist, is the extraordinary number of seeds formed by many plants and scattered over the soil in which they grow. This habit is not confined to species which usually yield great numbers of seeds, but seems common to all the desert flora. Thus a little violet which seldom attains a height of three inches, common about Caldera, often exhibits from thirty to forty pods full of seeds upon a single plant. When one looks down upon it, he can see only a mass of yellow flowers and fruit pods. I might mention many other plants in which the same peculiarity is noticeable.

One other apparent adaptation deserves mention. It is said that a majority of the desert plants are shrubs, or at least, are suffruticose, and this accords with my own observation. I found that such growths are in the habit of shedding their leaves in the summer instead of winter, thus reversing the ordinary process of nature. By this means they reduce their vital expenditure to a minimum at a season when they need to husband their utmost strength in order to resist long and continued dryness. This leaves them free to exert their full powers at a period when they are most likely to imbibe the revivifying moisture. Aided in this by their thick, long and knotty roots and close, non-evaporating bark, these shrubs, which seem to be nothing but dead stocks in the summer, can withstand even several years of drought.

After premising this much concerning the locality and the flora in general, I will give some account of my own explorations in the Desert of Atacama. It was my good fortune to reach Caldera, the sea-port of Copiapo, in the month of September last, which is early spring time in that latitude. It also happened to be a year when this rare flora had sprung up, a thing which I understood from residents had not occurred for several years previously. A single rain had fallen in the month of June, and at the time of my visit the plants were in full bloom. Had the visit been made two months later, I was assured that not a flower would have been in sight.

The sandy slopes around Caldera, especially where the soil was shaded by rocks, bore quite a number of species, the most common of which was a dusty–looking composite (*Encelia tomentosa*, Walp.) wlth pale yellow ligulate flowers, known popularly as *Corona de fraile*, so-called from the convex mass of disk flowers which remind one of the shaven crown of a priest's head. Several other species of Compositæ also occur in this vicinity, such as *Polyachyrus fuscus*, Walp., a tomentose plant with much dissected leaves and showy, oblong, close-flowered heads of purple florets, *Chuquiraga acicularis*, Don., a half shrubby, bushy, and very forbidding plant, which has crowded spine-tipped leaves, and small heads with yellow spinescent scales, and a *Closia*, the flowers and odor of which put one in mind of our Chamomile. Two delicate *Cuscutas* twined about small plants on the open sand, one of them with silk-like stems and white flowers, and the other with masses of purple blossoms. Both of these are popularly named "*Cabellos de angel*," Angel's hair. Lying close against the sides of rocks was a queer Asclepiadaceous shrub known as *Cynoctonum viride*, Phil. The stock which manages to survive the summer is short and stumpy, with a thick head like an old pollard willow, from which it sends out new green shoots whenever the winter rain falls. Out upon the open sand one frequently meets with *Frankenia aspera*, Ph., throwing its dark colored branches over the ground, *Scilla triflora*, Ph., a bulbous plant with erect stems and racemes of pretty white flowers, and *Oenothera Coquimbensis*, Spach., one of the species noticeable for commencing to flower when not much larger than a needle, and continuing the process till it is two feet in height. Here too I collected several species of *Eritrichium*, *Heliotropium*, *Osteocarpus*, *Tetragonia*, and other plants which there is no room to mention.

After rambling over the Caldera sands till my feet grew weary, I made a number of expeditions on horseback and by rail to more distant points. One of these was to a gorge among the hills seven or eight miles north of Caldera, known to the people as the "*Quebrada* (ravine) *de los leones*." I was informed that the name owed its origin to the fact that in former years a number of pumas or Chileno lions had been killed in the ravine. Here also lovers of the chase had often come to hunt the guanaco, an animal somewhat smaller than the llama, but belonging to the same family. Neither lion nor guanaco, however, appeared to welcome me to his lair, a circumstance which I did not much regret. On the way to this mountain defile we rode along the sea-shore for several miles, and then struck inland over a wide track of loose, shifting sand into which our horses sank nearly half way to the knees, and which is continually blown about by the wind. Along this route I gathered a number of interesting plants. Among them was a *Calandrinia*, the common name of which is "*Pata de guanaco,*" or guanaco's foot, so-called from the fancied resemblance of the shape of its leaves to the hoof of the guanaco. This elegant flower throws up a tall, branching stem, each branch bearing on long naked peduncles several large and brillant purple blossoms, a conspicuous object upon the desert. Another species, or perhaps only a variety of this, much smaller in size, grows near the sea-shore, having a bright yellow corolla. In clumps around which the sand is often heaped in ridges as if against a wall occurred an odd-looking, yellow-flowered shrub of the Apocyneæ, (*Skytanthus acutus,* Meyen), popularly named "*Cuerno de cabra,*" or Goat's horn, from the singular habit which its long, pointed follicles have of twisting themselves into the shape of a pair of goat's horns. The resemblance is so exact, that every one calls them by that name at first sight. In similar situations is found an *Ephedra,* vulgarly "*Pingo-pingo,*" the naked sharp-pronged stems of which seem just in place in such a region. We frequently rode through mounds of sand in which clumps of these two shrubs were completely buried.

Farther along the sand was firmer, but attended by a new danger to the horseman. A small lizard, of a livid color and some six or eight inches in length, the only animal that we encounted in our excursion makes its burrow in these inhospitable wastes. As the animal is quite gregarious in its habits, we often came upon spaces entirely honeycombed by scores of these little creatures. Riding incautiously upon such ground our horses would suddenly sink over the fetlock into these burrows and stumble badly, running great risk of breaking a limb or throwing the riders over their heads. About such spots, however, some charming flowers were obtained. One of these was *Cruckshanksia Geisseana*, Ph , an elegant plant, covered with masses of showy yellow flowers, very fragrant, and remarkable for its involucral, long-stiped sepals. Another was a Bignoniaceous species, named *Argylia*, which has long, finely dissected radical leaves, and a scape ten or twelve inches high, having a large cluster of yellow trumpet-shaped flowers at the summit. Still another plant of much interest, growing in clumps, was an Umbellifer called *Eremocharis*, a tall almost naked stemmed undershrub, with long internodes and curious subbipinnatifid leaves, which emit the odor of apples when first plucked or bruised.

Along this route also grew some of the most peculiar Cacti that I had ever seen. The most noticeable of all belongs to a genus created by Philippi, and is, I believe, confined to this desert, named *Eulychnia breviflora*. It throws up from a cluster of roots numerous columnar stalks about as large in diameter as a man's arm, and armed with innumerable long, unequal, needle-like spines. The flower is on the summit of the stalk, not unlike a large cup in aspect, the lower part of which is covered with crinkly velvet hairs of a lavender hue, above which rises a single row of stiff white petals, including a host of delicate stamens. Another Cactus of the melon variety, not over eight inches high, and not unlike a pineapple in shape, has its spines twisted about the stem so that they resemble a bird's nest, inside of which the small red flowers hide like eggs.

When we reached the Quebrada, we found it to be a very rocky ravine running up the hillside between two eminences, along the slopes of which were heaped many boulders, as if carried down there by floods in former ages. Among the rocks trickled a small stream of water, which soon lost itself in the sand at the bottom of the ravine. As the day was quite warm, and I was heated and tired with my long ride, it sounded very pleasant to hear the gurgling of water, and as I have often done on such occasions in the White Mountains, I hastened to scoop up a drink in the hollow of my hand. My companion, a native Chileno, laughed at my motions, and with good reason, for I had no sooner tasted the water than I spit it out with disgust. Who could drink brine?

All the pools and rivulets which occur in this region absorb more or less soda from the soil, which seems everywhere impregnated with this mineral. Luckily we carried with our lunch a bottle of the condensed water used in Caldera, or we should have been unable to quench our thirst. For this disappointment I was consoled by finding a number of beautiful flowering plants among the boulders that filled the ravine.

The most attractive of the plants were a very handsome species of *Alstrœmeria*, which exhibited great lilac flowers, the petals streaked with blue veins and yellow blotches, and a tall *Centaurea* with white heads as gay looking as those of our Ox-eye daisy. A shrubby *Euphorbia*, five or six feet in height, with large white flowers, was abundant. This plant possesses a copious milky juice which pours from every wound made in its stem or leaves, and from this property is popularly called *Lechero* (milkman) and hence has been named by Philippi *E. lactiflua*. A pretty *Stachys* peeped from under the rocks whose shade it loves, and a broad-leaved, clammy *Nicotiana* and a *Solanum*, heavily laden with trusses of bright purple blossoms grew in more sunny spots. In this vicinity also flourishes a flower greatly coveted by the inhabitants of Caldera and called by them *Añuña* (*Habranthus añuña* Phil.). It springs from a bulb of the size of an onion and bears at the summit of a tall scape a cluster of yellow tubular blossoms. The most charming of all the plants collected in this quarter is a *Tropaeolum* (*T. tricolor*, Lind.) a delicate vine which climbs upon shrubs in thick masses, profusely decorated with spurred corollas whose bright tints of orange, red and blue offer a standing invitation to all the humming birds that live in the vicinity.

A few days after returning from this excursion, I made another in the company of a friend to a craggy hill known as the *Morro*, some ten miles south of Caldera. Morro is a Spanish word denoting any object that is round and over-hanging, and is applied on the coast to high rounded promontories that project into the ocean. Our route to this promontory lay by the seaside, around a lovely bay and across a beach two or three miles in extent, which at low tide is as smooth and hard as a floor. So beautiful was the day and so pleasant the ride by the sparkling blue waters of the Pacific, that even if there had been no botanical interest in the trip, I should have been more than satisfied. I returned, however, with my portfolio full of specimens of unique interest to the botanist. Before reaching the seashore or upon its borders, we passed through clumps of various species of *Nolana*, *Dolia*, *Phaca*, *Malesherbsia*, *Suaeda* and other plants which I will not attempt to describe. One species, however, deserves mention on account of its eminent fitness for a desert life, and that is an *Euphorbia*, named *E. Copiapina* by Philippi. It has a multitude of short stems which rise directly from a huge underground tuber, and lie in a circle upon the ground. The stems, leaves and flowers are lurid in hue as if burnt by a tropical sun, and the tuber, in aspect much like a big turnip, is full of milk. Other things might perish in that rainless climate, but such a tuber would be preserved for many years in the dry sand.

It was a very rugged and precipitous ascent that we had to climb when we struck the Morro. In places there was no path, the rocks were sharp, and the feet of our horses were continually sliding out from under them. In spite of such obstacles we finally reached the summit, and then hobbling our steeds we sat down to rest and to look around us. The view seaward was simply magnificent. The broad Pacific stretched out in its illimitable vastness towards the west, and the coast line of sandy plains, hillocks and rocky capes, indented by beautiful bays and estuaries, could be seen for miles until it faded into haze. Around us were jagged cliffs and deep precipices descending to the sea, but to my amazement a garden of beauty clothed the few patches of soil which lodged upon the summit and in the crevices of the rocks. Here were in this savage looking place at least a score of the finest species of flowers that I had yet discovered in the Atacama. *Nolana elegans*, Ph., fairly hid the backbone of the highest ridge with its bells of blue. *Achyrophorus*, a Composite with large golden heads, adorned the lower slopes. Fine specimens of the *Calandrinia* and *Alstroemeria* already collected at the Quebada de los leones added their bright hues to this mountain park. *Loasa Urmenetæ*, Ph., ran over other plants or trailed upon the ground. A handsome *Verbena* and a little *Gilia* enlivened the scene. Several species of *Oxalis* occurred in sandy nooks, the most curious of which was *O. gigantea*, a thick watery stemmed shrub, as high as my head, the upper part of the stalk bearing a long spike of yellow flowers arranged irregularly around the rachis. Here, too, is found the only *Tillandsia* known in the region (*T. Geisseana*, Ph.), which is, strangely enough, a cactus epiphyte. Many other interesting species besides these were added to my collection in this attractive spot, not the least valuable being six or seven rare lichens. No doubt the remarkable fertility of this rugged headland is owing to the clouds which bathe its brows with moisture every night and morning in the months of August, September and October.

I have space only to give a brief sketch of an excursion that I subsequently made by rail from Caldera to Monte Amargo, twenty-five miles inland. The engineer, a pleasant and well-informed Englishman, invited me to take a seat with him in the engine where, he said, I could survey at my leisure the road and the arid pastures on which the mules were feeding. I saw numbers of mules, it is true, and in fact, as they have a special fondness for collecting in droves upon the railroad track, we came near running over some of them, a calamity which I learned was by no means infrequent, but what the creatures could find to feed upon passed my comprehension, unless it were a very disagreeable plant that seems smeared with varnish over all its parts, and known from that fact as *Alona vernicosa.* An animal which could browse on such herbage must be quite able to relish tar, varnish and such-like substances. This plant occurs all along the railway to Monte Amargo, and bears a very pretty bright blue flower. Possibly it was the flowers that attracted the mules, as it could not have been the taste.

Monte Amargo itself is only a railway station situated in a soda swamp. In the alkaline pools around it I gathered several species of Characeæ and Naiadaceæ, and in the bogs were growing a number of saline plants such as *Salicornia* (*S. Peruviana*, HBK.), *Triglochin* and several Cyperaceæ. Through this swamp runs the Copiapo River, or rather the modicum which is left of it after being used for irrigation in the valley above. It goes no further, being here absorbed by the desert sands. Upon its banks I saw for the first time the Chañar tree (*Gourlica Chilensis*, Clos.), a sturdy close-branched, somewhat spiny shrub, which at the time of my visit was loaded with its bright yellow flowers. This shrub yields a toothsome fruit something like a plum, that is greatly relished by man and beast. It is often dried and carried as food upon journeys. I saw old stones lying under the trees which had been gnawed into by desert rats, which are extravagantly fond of the kernel. Here, too, was a gigantic *Juncus*, its numerous thorn-pointed stalks ten feet in height and spreading in all directions like chevaux de frise. It required considerable courage to thrust the hand among these spears in search of specimens.

Out upon the open sands I came upon a flora different from any previously collected. Here I began to meet with the *Adesmias* which are so numerous on the Pacific coast. Philippi enumerates 134 species that occur in Chile alone. More than a dozen of them have been discovered in the Atacama Desert. In this locality likewise flourishes *Eritrichium guaphaloides*, DC., which the inhabitants of the province of Copiapo call *Te del burro* or *Te del campo*, and of which they make an infusion and drink like Chinese tea. The *Acacia Cavenia* and *Lycium Chilense* stand like lonely sentinels upon the desert. Many other things rare and interesting greeted me in my wanderings over this region, but they cannot be noticed here. Of course the cosmopolitan plants, which go wherever man goes, were here to nod their familiar forms in my face. *Sonchus oleraceus*, *Solanum nigrum*, *Erigeron Canadense*, *Argemone Mexicana*, *Raphanus sativus*, *Erodium cicutarium*, *Gnaphalium purpureum*, and half a dozen other old friends were there to make me feel at home in this strange and distant land.

I was pretty well fagged out with my day's tramp when I heard the puffing of the train on its way back from Copiapo. My good friend, the engineer, was kind enough to respond to the waving of my handkerchief by stopping the cars and giving me a snug seat in the locomotive. Of my three rides none proved more enjoyable or botanically more profitable than the one on the iron horse to Monte Amargo.

CONTRIBUTIONS FROM THE HERBARIA OF
COLUMBIA COLLEGE.—18.

Contributions to American Bryology—II.

A Supplementary Enumeration of Mosses collected by Mr. John B. Leiberg, in Kootenai Co., Idaho.

BY ELIZABETH G. BRITTON.

(Reprinted from Bulletin of the Torrey Botanical Club, Vol. XVIII., No. 2).

Contributions to American Bryology.—II.

By Elizabeth G. Britton.

A Supplementary Enumeration of the Mosses Collected by Mr. John B. Leiberg in Idaho, with Descriptions of two new Species.

(Plate CXIV).

Continued from Vol. XVI., Page 112.

Andræa petrophila, Ehrh. Dry slate rocks, Traille River basin, May, 1889 (6).

Buxbaumia indusiata, Brid., previously listed as *B. aphylla*, L. Decaying logs, Traille River basin (159).

Georgia pellucida, (L) Rab. (*Tetraphis pellucida*, Hedw). Decaying logs, Lake Pend d'Oreille, May, 1889 (155).

G. geniculata (Girgens). Braith. (*T. geniculata*, Girgens). Decaying logs in deep ravines, basin of Traille River, July, 1889 (194).

Oligotrichum Lyallii, (Mitt.) Lindb. Packsaddle Mountain, 8,500 feet, Lake Pend d'Oreille (73).

Polytrichum commune, L. Granite basins, near Rathdrum (229).

P. piliferum, Schreb. On rocks, Lake Pend d'Oreille, June, 1889 (110).

Var. *Hoppei*, Rab. (*P. Hoppei*, Hornsch.) Packsaddle Mountain, 6,000 ft. alt., Lake Pend d'Oreille, July, 1889 (163).

Fissidens limbatus, Sull. On granite ledges between high and low water line, Lake Pend d'Oreille, March, 1889, fertile (144).

F. osmundoides (Sw.), Hedw. With the above, sterile.

F. adiantoides (L.), Hedw. var. *immarginatus*, Lindb. Shores of Lake Pend d'Oreille, September, 1889, fertile (214).

Ditrichum flexicaule (Schleich.) Hpe. (*Leptotrichum flexicaule*, Hpe.) Exposed quartzite ledges, Traille River basin, September, 1889, sterile (232).

Dicranella secunda (Sw.), Lindb. (*D. subulata*, Schimp.) Shady canyons, Traille River basin, in woods, North Fork basin, May and June, 1889 (189).

Dicranella crispa (Ehrh.) Schimp. Upturned trees, broken soil, Traille River basin, September, 1889 (69).

Blindia acuta, (Huds.) Br. & Sch. On schistose boulders, deep ravines, Bareknob Range, Traille River basin, July, 1889 (207).

Dicranoweisia crispula, (Hedw.) Lindb. Granite ledges, Lake Pend d'Oreille, May, 1889 (193).

Dicranum schisti (Gunn.), Lindb. (*D. Blyttii*, Br. & Sch.) Fissures of quartzite rocks on mountains, 4,000–5,000 ft. alt., near Rathdrum, April, 1889 (178).

D. Starkei, Web. & Mohr. Granite ledges, Lake Pend d'Oreille, 5,000-8,000 ft., July, 1889 (205).

Dichodontium flavescens (Dicks.) Lindb. (*D. pellucidum*, var. *serratum*, Schimp.) Wet rocks in streams, spray of waterfalls, Lake Pend d'Oreille, March and May, 1889 (62).

Phascum acaulon, L. var. *piliferum* (Schreb.) Braithw. Grassy open places, Lake Pend d'Oreille, Feb. 1889 (117).

Pottia Heimii, (Hedw.) Fuernr. Clark's Fork of the Columbia, Lake Pend d'Oreille, Sept., 1889 (212).

Mollia tortuosa (L.) Schrank. (*Barbula tortuosa*, Web. & Mohr.) Crevices of rocks near water line, Lake Pend d'Oreille, also shifting sand bars, mouth of Clark's Fork, March, 1890 (235).

Tortula subulata (L.) Hedw. (*Barbula subulata*, Beauv.) Upturned roots, Lakeside, March, 1890 (210).

T. mucronifolia, Schwægr. (*B. mucronifolia*, Br. & Sch.) Sandy soil, mouth of Clark's Fork, Lake Pend d'Oreille, Sept. 1889 (209).

Barbula rubella (Hoffm.), Mitt. (*Didymodon rubellus*, Br. & Sch.) Banks of silt, Clark's Fork, Sept. 11, 1889 (211). Ledges and loose boulders, low water mark, Lake Pend d'Oreille, Sept. 1889 (227).

Hymenostylium curvirostre (Ehrh.) Mitt. (*Gymnostomum curvirostrum*, Hedw.) Wet limestone ledges, 2200 ft. alt., Lake Pend d'Oreille, March, 1890 (46).

Leersia alpina (Sm.) Lindb. (*Encalypta commutata*, N. & H.) Loose soil on mountains, 3,000–5,000 ft. Lake Pend d'Oreille, May, 1889 (33).

L. extinctoria (L.) Leyss. var. *pilifera*, (Funck.), Braithw. (*Encalypta vulgaris*, Hedw. var. *pilifera*, Schimp.) In small bright yellow cushions on naked soil, 2,500 ft. alt., on Cape Horn Mountain, Lake Pend d'Oreille, April, 1890 (242).

L. SELWYNI (Aust.) (*Encalypta Selwyni*, Austin). On magnesian limestone and dolomites in canyons, Lake Pend d'Oreille, May–July, 1889 (166).

Grimmia apocarpa, Hedw. Wet rocks, Traille River basin, March, 1889 (157).

Var. *rivularis*, (Brid.) W. & M., (*G. rivularis*, Brid.) Traille River, March, 1889 (151). On basaltic rocks, Spokane River, May, June, 1889 (226).

G. conferta, Funck. Exposed granite ledges, Lake Pend d'Oreille, April, 1890 (245).

Var. *obtusifolia*, Sch. in same locations (246).

Var. *pruinosa* (Wils.) Braithw. (*G. pruinosa*, Wils.) Very common on dry limestone ledges, Cape Horn Mountain, 3,000 ft. alt., April, 1890 (247).

Grimmia torquata, Hornsch. Since the description of the fruit was published, (BULLETIN, xvi. 107), Mr. Leiberg has collected much finer specimens showing the fugacious peristome, and annulus. The teeth are short and broken, with a median line; the annulus is composed of many rows of cells, falling in fragments with the lid. (See Rev. Bryol. xvi. 64).

GRIMMIA PHILIBERTIANA, n. sp., Plate CXIV. Rare on quartz croppings of metaliferous veins, 6,000 ft. alt., divide between Traille River and Independence Creek, Sept. 27, 1889 (219).

Diœcious; plants pulvinate in small dark green cushions; stems 2-3 cm. high, naked and decumbent below, branching and spreading above; leaves erect-incumbent when dry, not secund, spreading when moist, 1½-2 mm. long; lanceolate, carinate, with recurved margins, and toothed hair-points 15 mm. long, but generally deformed and bearing granulose, globose propagula on the tips of the leaves or retuse and bifid along the midvein; cells above rounded, hexagonal, nearly 1 μ in diameter, faintly sinuous and oblong at base, discolored, with slight enlargement at the basal angles; vein heavy 1½ μ wide at base, rounded at back, sulcate above. Perichætium also deformed, leaves broader, inner short, triangular and hyaline at base. Pedicels one or two from the same perichætium; seta twisted, variously bent, 3-5 mm. long; capsule 1 mm. long, broadest at the mouth, smooth when dry, pale with a red rim; columella long, slender, excurrent; teeth recurved, red, undivided, with five or six short, broad segments below and four or five slender papillose internodes above; annulus of very delicate cells; lid with a beak nearly 1 mm. long, straight or oblique, calyptra mitrate just covering the beak.

Mistaken for *G. Hartmanni*, Schimp. (BULLETIN, xvi, 340, and Rev. Bryol. xvii, 16) which it so closely resembles that the figures given by Husnot (Musc. Gall. t. xxxix) and Braithw. (Brit. Mosses. t. xlviii.) would do for either. Specimens were sent to M. Philibert, whose excellent description in the Revue Bryologique xiv. p. 50, seemed to me to answer perfectly to my specimens. He kindly sent me fruiting specimens from Corsica, which differ in the plants being much larger, with stems 6-7 cm. long, leaves much twisted and secund, narrower and longer, much less deformed by propagula; with cells much more sinuous and the teeth of the peristone less papillose and *bifid?* so drawn by Mr. Anderson to whom I sent the only perfect peristome of *G. Hartmanni.* But it is evident that this is not always true, for Philibert says of these same Corsican specimens "Dents lanceoleés-lineares, obtuses, entieres, d'un rouge orangé assez pâle; tres-lisses dans les deux tiers inferieurs; le tiers superieur, légèrement papilleux." Ours are not *obtuse*, bright red not orange-colored, and conspicuously papillose. The difference between figs. 28 and 35 is also not so great in all specimens, these being extremes.

Dedicated to M. H. Philibert, Prof. honoraire de la Faculte des lettres, Aix, Bouches-du-Rhone, France, who has kindly furnished me with fruiting specimens, and who says: "Je croix que cette forme dois constituer une espèce nouvelle."

G. Muehlenbeckii, Schimp. Granite ledges, Lake Pend d'Oreille, May, 1889 (3 pp.).

G. montana, Br. & Sch. var. *brachyodon* (Aust.) L. & J. Granite ledges, Lake Pend d'Oreille, May, 1889 (53 pp.). Quartzite ledges, 5,000 ft. alt. Rathdrum, April, 1889 (188).

G. alpestris, Schleich. Granite ledges, Chilco range, 6,500 ft. alt., May, 1889 (40). On erratic blocks of granite, Lakeside, Lake Pend d'Oreille, March, 1890.

G. ovata, W. & M. (*G. commutata*, Huebn.). Ledges near water line, Lake Pend d'Oreille, April, 1889, Feb., 1890, (13 & 17).

G. calyptrata, Hooker. On dry granite boulders, 2,500 ft. alt. Lake Pend d'Oreille, March, 1890 (55).

G. campestris, Burchell (*G. leucophæa*, Grev.). Dry exposed ledges, in closely adhering whitish tufts, Spokane River at Post Falls, above high water mark, April, 1890 (239).

G. *Nevii*, C. M. (*Racomitrium Nevii*, S. Watson). Wet ledges, Lake Pend d'Oreille, May, 1889 (19 pp).

G. *canescens* (Timm.) C. M. (*R. canescens*, Brid.). Rocky places, Lake Pend d'Oreille, Sept., 1889, fertile (149). On the ground on gravel bars in Traille River, submerged at high water, very abundant, sterile, July, 1890.

G. *hypnoides* (L.) Lindb. (*R. lanuginosum*, Brid.). Granite ledges, Lake Pend d'Oreille, sterile, July, 1889 (47).

G. *ramulosa*, Lindb. (*R. microcarpon*, Brid.). Granite ledges, Lake Pend d'Oreille, May, 1889 (186).

Pohlia pulchella, (*Webera pulchella*, Schimp.). Lime springs, Gold Creek, Lake Pend d'Oreille, April, 1890 (237).

BRYUM LUCIDUM, n. sp. (BULLETIN, xvi, 340).

Plants slender, scattered not gregarious, light glossy green; stems from radiculose stolons, 2-3 cm. high, simple and naked below; leaves rosulate, not twisted when dry, 3-5 mm. long, broadly elliptical above, with parallel margins at base, blunt with the vein disappearing below the apex or with a serrate-cuspidate point; vein heavy and frequently red at base, tapering and vanishing below the apex; margins of long prosenchymatous cells forming small appressed teeth, entire below. Cells of the lamina parenchymatous, elongated hexagonal. 1 × 2μ.

Diœcious. Pedicels single, 3-4 cm. long, stramineous, lustrous and sulcate; capsule reflexed, horizontal or erect, 5-7 mm. long, constricted below the mouth, neck short; teeth with a very faint median line (omitted in fig. 5) segments of endostome split, cilia 3-4 not appendiculate, faintly papillose, very irregular, variously divided and elongated; lid apiculate, calyptra cucullate, annulus not seen.

This species belongs to the section Rhodobryum nearest to *B. proliferum* (L). Sibth. (*B. roseum*, Schreb.), from which it differs in its habit, size, leaves not twisted when dry, pedicels single, marginal cells of leaves longer and in the irregular, not appendiculate cilia.

Collected on mountain slopes near Rathdrum in May, 1889 (224) and on the ground among pine needles, slopes of the Traille River; alt. 4,500 ft., Oct. 18, 1889, fruiting. Also sent to me in exchange for the above by Prof. D. C. Eaton, collected by R. S.

Williams at Tiger Butte, Montana, June 19, 1887 (60); also by John Macoun, who found it on the summit of the Gold Range, B. C., alt. 6,000 ft. under *Abies subalpina*, Aug. 8, 1889, sterile, named by N. C. Kindberg *Mnium simplex*, ms.; quite recently received from W. N. Suksdorf, collected in Falcon Valley, Washington, May 8, 1890 (7) sterile.

Meesia triquetra (L.) Lindb. (*M. tristicha*, Funck). Along open places by every mountain stream, July, 1890 (255).

Bartramia Œderiana (Gunn.) Sw. Precipices and ledges of the Chilco Range, May, 1889. Wet rocks in cold ravines, Traille River basin, April, 1889 (118).

B. ithyphylla, Brid. Fissures of rocks, Packsaddle Mt., 8,500 ft., July, 1889 (50).

B. Menziesii, Turn. Granite ledges, Lake Pend d'Oreille, April and May, 1889 (122).

Leskea polycarpa, Ehrh. Granite ledges, Lake Pend d'Oreille (240).

Pseudoleskea atrovirens (Dicks.). Br. & Sch. Outcroppings of quartz veins, Traille River, divide, Sept., 1889 (220).

Amblystegium Sprucei, Bruch. Crevices of rocks, Lake Pend d'Oreille, May, 1889 (216).

A. cordifolium (Hedw.) DeNot. Edges of beaver ponds, Lake Pend d'Oreille, Oct., 1889 (222).

Limnobium dilatatum, Wils. (*L. molle*, Br. & Sch.) Sterile, on ledges at low water line, Lake Pend d'Oreille, Sept. 1889 (265).

L palustre, Huds. Mountain streams, Lake Pend d'Oreille, Sept., 1889, sterile (215).

L. arcticum, Sommerf. Waterfalls, Traille River basin, Sept., 1889, sterile. (16pp). In cold mountain streams, Sept., 1890, sterile (266).

L. obtusifolium (Hook.), L. & J. Submerged rocks, swift mountain streams, fertile (16). In 10-25 feet of water, Lake Pend d'Oreille, sterile (79). According to Lesquereux and James. Manual, p. 400, this species is rare in fruit, having been found but once by E. Hall and then without the operculum, but specimens in the James herbarium labelled *Rhynchostegium rusciforme*, Br. & S., collected by Bolander in rivulets, California are fertile and operculate. Mr. Leiberg's specimens show a short, oblique, operculum and great diversity in the basal cells of the leaf.

Isothecium stoloniferum, Hook. Granite ledges, in shady places, Lake Pend d'Oreille, May, 1889 (58 and 174).

Pterigynandrum filiforme, Hedw. On granite ledges, Lake Pend d'Oreille (23).

Heterocladium dimorphum, (Brid.) Br. & Sch. Mineral Point, Lake Pend d'Oreille, sterile on dry slate ledges (175). On quartzite ledges 5,000 ft. alt., divide between Traille River and Independence Creek, Sept., 1890.

Heterocladium aberrans, Ren. & Card. With *H. loreum*, fertile; shady woods on the ground, Traille River basin, 1888 (84pp). Granite ledges Lake Pend d'Oreille with *Isothecium*, May, 1889 (174pp). On rocks, trees and on the ground, along streams, April, 1890 (138).

H. heteropterum, Sch. On quartz croppings of metalliferous veins, Traille River basin, June, 1890; also in large mats on ledges, near water line, along Traille River, July 19, 1890 (254).

Hylocomium parietinum (L.), Lindb. (*Hypnum Schreberi*, Willd). Granite ledges, Lake Pend d'Oreille (168).

H. squarrosum, L. Grassy places, Traille River, Sept., 1889 (71).

Tripterocladium leucocladulum, Muell. (*Platygyrium rupestre*, Kindb. BULLETIN xvii. p. 276.) Compared with the types kindly sent me by Chas. Mohr of Mobile, Alabama, and with Macun's Canadian Mosses No. 469. Crevices of granite ledges, shores of Lake Pend d'Oreille, sterile, April, 1890. Hanging in dense masses from escarpments of dolomite, in shady cañons, North Gold Creek, Lake Pend d'Oreille, fertile. May, 1890 (241).

Pterigophyllum lucens, Brid. Traille River basin, July, 1890 (249).

Climacium dendroides, W. & M. Traille River basin, Feb. 1889 (176).

Antitrichia curtipendula, Brid. var. *gigantea*, Lesq. On trees, Traille River Basin, June, 1889 (177).

Alsia abietina, Sull. pl. m. In one location only under overhanging ledges. Lake Pend d'Oreille, March, 1889 (156).

Description of Plate CXIV.

Fig. 1.—BRYUM LUCIDUM, E. G. BRITTON, about natural size.

Fig. 2.—An enlarged capsule.

Fig. 3.—The peristome more highly magnified.

Fig. 4.—A very young capsule, with calyptra considerably magnified.

Fig. 5.—One tooth of the outer peristome considerably magnified.

Fig. 6.—Portion of the inner peristome, showing three of the cilia; one of them branched.

Fig. 7.—A leaf somewhat enlarged.

Fig. 8.—Tip of leaf highly magnified.

Fig. 9.—A portion highly magnified, showing basal cells and margin.

Fig. 10.—A portion highly magnified, showing lateral marginal cells and their contact with the inner cells taken about one-third below the apex.

Fig. 11.—*Bryum proliferun* (L.) Sibth., about natural size.

Fig. 12.—An enlarged capsule.

Fig. 13.—A fragment of the outer peristome.

Fig. 14.—A fragment from inner peristome, showing the two appendiculate cilia and open carinate segments.

Fig. 15.—Leaf somewhat enlarged.

Fig. 16—Tip of leaf highly magnified.

Fig. 17.—Fragment of margin of leaf two-thirds of the way up, showing contact of marginal with inner cells, highly magnified.

Fig. 18.—GRIMMIA PHILIBERTIANA, E. G. BRITTON, about natural size.

Fig. 19.—An old wrinkled capsule considerably magnified.

Fig. 20.—Two ripe plump capsules; one with straight and other with oblique beak, considerably magnified.

Fig. 21.—The peristome closed, considerably magnified.

Fig. 22.—The peristome open, considerably magnified.

Fig. 23.—Teeth of the peristome more highly magnified.

Fig. 24—The simple tip of a tooth highly magnified.

Fig. 25.—A leaf somewhat magnified, showing peculiar margin which appears to be double, or in some specimens double near the apex and becoming free to revolute towards the base.

Fig. 26.—Tip of leaf in normal condition highly magnified.

Fig. 27.—Abnormal tip, bearing propagula on the distorted and abnormally situated teeth.

Fig. 28.—Highly magnified cells from near base of leaf.

Fig. 29.—Capsule, old and wrinkled, of *G. Hartmanni*, Schimp., from Corsica. Collected by H. Philibert, July 18th, 1870.

Fig. 30.—Capsule of same moistened, showing peristome closed, somewhat magnified.

Fig. 31.—Tooth from peristome of same, showing the *bifid tip!* considerably magnified.

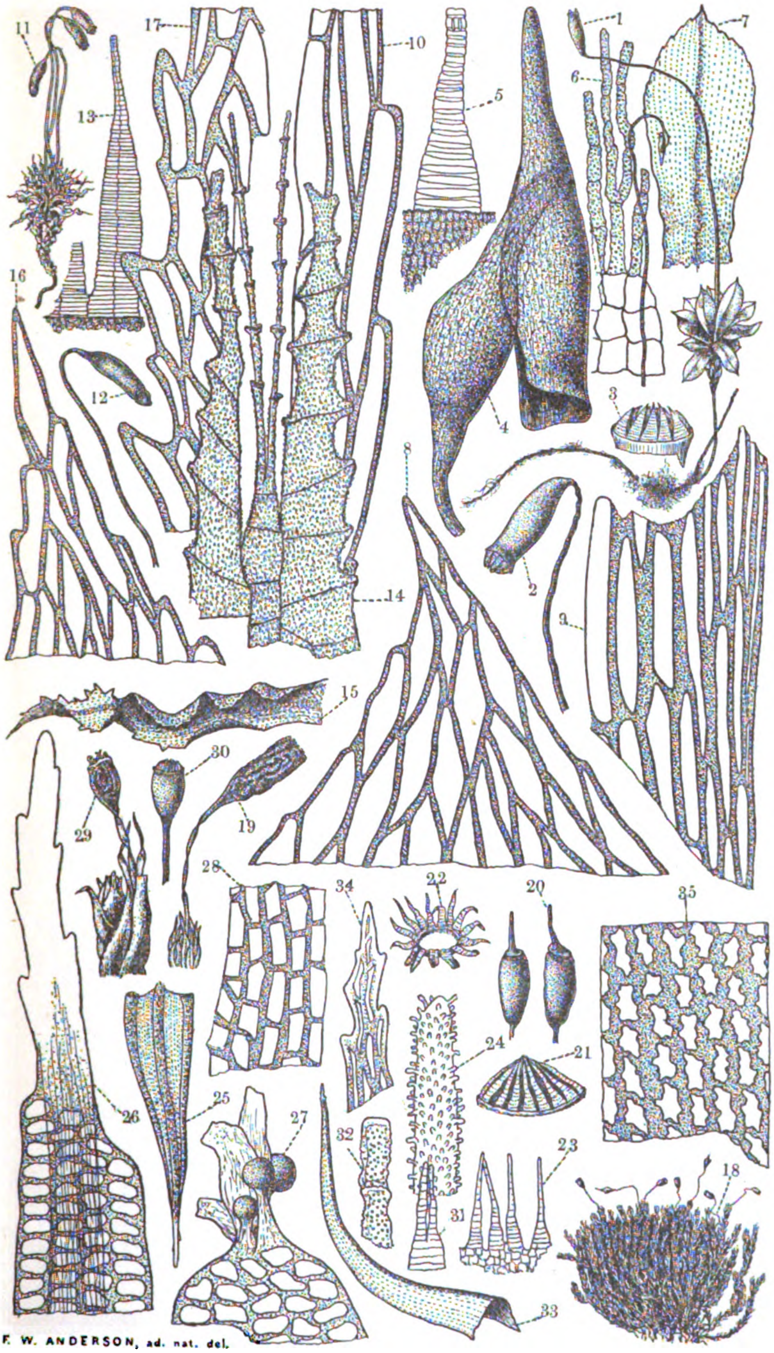
Fig. 32.—The end of one-half of a bifid tip highly magnified.

Fig. 33.—A leaf somewhat enlarged.

Fig. 34.—The tip of a leaf highly magnified.

Fig. 35.—A fragment showing cells near the base of leaf.

BULLETIN TORREY BOTANICAL CLUB. Plate CXIV.



F. W. ANDERSON, ad. nat. del.

E G. Britton. BRYUM LUCIDUM and GRIMMIA PHILIBERTIANA, n. sp.

CONTRIBUTIONS FROM THE HERBARIA OF
COLUMBIA COLLEGE.—No. 19.

Notes on North American Halorageæ.

BY THOS. MORONG.

(Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. XVIII., No. 8, Aug. 1891.)

Notes on North American Halorageæ.

By Thomas Morong.

The order *Halorageæ* consists mostly of aquatic plants, and, as arranged by Bentham and Hooker, comprises nine genera, four of which occur in northern North America and one other in southern Mexico. These genera differ widely from each other in some important points, but so far as the structure of the ovules and embryos is concerned, form a very natural family. The Order was formerly classed by most botanists with the Onagraceæ, and in some botanical works many of the genera are still retained in that family, but they evidently differ radically from the members of that Order in nearly all the essential ordinal characteristics. *Ceratophyllum* was included among the *Halorageæ* by Bentham in his Flora Australiensis, but probably by mistake, as the peculiar embryo, the four verticillate cotyledons and the exalbuminous ovules of *Ceratophyllum* absolutely forbid its introduction into this group of plants. Curiously enough, too, Bentham's own ordinal description debars this genus from a place here.

The only objection to the arrangement of Bentham and Hooker which is likely to be made is in regard to the position of *Callitriche*, which has commonly been regarded as unique and as constituting an Order by itself. Upon a careful examination, however, it cannot be doubted that in habit, in its four-carpelled fruit, its ovules and embryos, this genus bears a very close relationship to *Myriophyllum*, while in the stamens and styles it strikingly resembles *Hippuris*, especially those forms of *H* *montana* which are monoecious. By some good judges, *Callitriche* has been included among the *Euphorbiaceæ*, with which, indeed, it has affinities, but from which it is widely divergent in having two styles and four-celled, indehiscent fruit, as well as in other characters.

The species as found in our country are, as a rule, strictly aquatic, but not invariably so, as a few of them grow on mud or moist ground by the side of streams or ponds, and two species of *Callitriche* make their home under the shade of houses or in the woods.

About thirty species are found in Canada and the United States.

The genera agree in having pendulous, anatropous ovules, nut-like or drupaceous, indehiscent, angular, costate or winged seeds, and a fleshy albumen with the embryo in its axis.

They may be briefly distinguished as follows:

Stamens one.
  Ovary one-celled. Leaves verticillate, linear or obovate. 1. *Hippuris.*
  Ovary four-celled. Leaves opposite, linear or spatulate. 2. *Callitriche,*
Stamens two to eight.
  Fruit triangular. Leaves alternate, pectinate or pectinate-pinnatifid. 3. *Proserpinaca.*
  Fruit four-sided. Leaves verticillate, subverticillate or scattered. The emersed entire, toothed or pectinate, the submerged pinnatifid. 4. *Myriophyllum.*

1. *Hippuris.* L. Gen. Pl. n. 1. (1737).

Flowers small, axillary, perfect, or by abortion sometimes neutral or pistillate. Apetalous. Calyx tube adherent to the ovary, the limb minute, entire. Stamens one, in the perfect flowers inserted on the margin of the calyx. Style filiform, stigmatic its whole length, and lying in a groove of the anther. Drupe one-celled, one-seeded. Only three species are known, all occurring in North America

Leaves linear, acute, six to twelve or more in a whorl. 1. *H. vulgaris.*

Leaves usually oval or obovate, obtuse, four to six in a whorl. 2. *H. tetraphylla.*

Very small Arctic plants, with linear, mucronate leaves, five to six in a whorl. 3. *H. montana.*

1. *H. vulgaris.* L. Sp. Pl. 4. (1753).

Springing from a perennial rootstock, with annual, simple, erect stems and whorls of six to twelve or more one-nerved linear or lanceolate leaves which are more or less decayed (sphacelated) at the tips, and 10-20 mm. long by 1-3 mm. broad. Stamens with short, thick filaments and comparatively large two-celled anthers, which dehisce laterally. Fruit oval, or somewhat four-sided, hollow in the interior, 2 or 3 mm. long, stigmas persistent. Common in Arctic America and Canada, It occurs also in Moosehead Lake, Maine (Porter), west to Oregon, and thence to California (Parish) and New Mexico. Mr. Safford sends it from the Straits of Magellan, and it is common in Europe and Central Asia.

Var. fluviatilis. Hart. Scand. Fl. 150 (1849).

A very luxuriant, deep water form, entirely or nearly submerged. Leaves 6 cm. long by 2-3 mm. wide, grass-like, numerous, in closely crowded whorls. Lake Winipeg (Macoun), Keweenaw Peninsula, Michigan (Robbins) and Oregon (Lyall). Not uncommon in Sweden.

2. *H. tetraphylla.* L. f. Supp. 81 (1781).

H. lanceolata. Retz. Obs. Fasc. 3, 7, t. 1 (1783).

H. maritima. Hell. Dis. Hipp. in Ust. Opusc. I. 11. t. I (1786).

This is usually a smaller plant than the preceding, rarely attaining a height of over 20 cm. Sometimes, however, as in Labrador specimens, twice that height. The leaves are in whorls of fours or sixes, oval, obovate or occasionally oblanceolate, but little, if at all, decayed at the tips, and often feather-veined. Fruit less than 2 mm. in length. It ranges from Alaska and Hudson's Bay to the Gulf of St. Lawrence, and from Sweden to Siberia.

3. *H. montana.* Ledeb. in Reich. Bot. 1. 71 (1827).

This diminutive northern plant, as Torrey and Gray remark, (Fl. N. A. p. 531), looks very much like a small *Galium.* Stems 3-6 cm. high. Leaves one-nerved, linear, mucronate, in fives or sixes, 5-6 mm. long, not decayed at the tips. Often monoecious, the flowers consisting of a single stamen or a single pistil; sometimes all the flowers in the axils of the whorls staminate. Stamens as long as the ripe fruit; filaments thick: anthers large. Fruit almost oval, minutely granulated, a little over 1 mm. in length; the persistent style shorter than the nutlet.

Turfy places in Siberia, Alaska and the Selkirk Mountains, British Columbia (Macoun).

2. *Callitriche.* L. Sp. Pl. 969. (1753).

Widely dispersed over the earth in warm and temperate climates. As usually reckoned, it numbers about twenty species, one half of them occurring in the United States. In some cases, however, the species run so close to each other that they can be distinguished only by fruit markings. In this paper Hegelmaier's classification of our North American forms is retained more for the sake of avoiding the creation of new synonyms than for any other reason. A stricter grouping would probably throw *C. verna*, *C. stenocarpa*, and *C. Bolanderi* into one. It is doubtful, too, if *C. verna* and *C. heterophylla* should be considered as distinct species, since they can be separated only by the fruit, and are constantly confounded. Each of them, also, varies more or less in the shape of the fruit, so that it is not always easy to place the specimens.

The leaves of most or all the species are covered on both sides with dark, colored dots termed by Engelman "stellate scales," and by Hegelmaier "stellate hairs." Under the microscope they appear to be composed of a dark ring in which is a slightly sunken disc with a minute cell in the centre from which radiate lines dividing the disc into several cells. They are more numerous in the aquatic than in the terrestrial species, in the former usually having four cell divisions, and in the latter eight, or sometimes split into twice as many divisions.

Authors have generally regarded the flowers as monoecious, calling the stamens and pistils separate flowers, although they may stand side by side in the same axil and enclosed in the same perigonium. In respect to this I am bound to say that I agree with Mr. Joseph Schrenk,* who observes "there is no reason why we should separate these two organs and call them two different flowers, when, in fact, they could not be any more closely connected than they really are." In the perfect flowers the stamens are clearly hypogynous, proceeding, as Mr. Schrenk states, from the same vascular bundle of which that of the pistil is a branch.

The flowers in most of the aquatic species are enclosed in a pair of small falcate or semilunar membranous bodies, which are by most authors termed bracts, by some a perianth, and by Mr. Schrenk in the article referred to floats. It is not easy to decide certainly upon the office of these bodies, but the explanation of Mr. Schrenk is ingenious and has several good reasons in its favor. That they are sacs containing air is evident. They are also most vigorous in the rosette of floating emersed leaves, where they would be of most service if really intended to impart buoyancy to the plant, decaying or shrivelling as the stem elongates. Another thing which seems to confirm this theory is the fact that they are wanting in the terrestrial species, but then, on the other hand, this is equally true of *C. autumnalis*, which is entirely submerged. Whatever may be the truth in regard to these bodies, we may properly speak of them as perigonial sacs.

As a rule, the flowers of *Callitriche* are diclinous, consisting of a single stamen or a single pistil, but in some species they will be either all perfect, or, whenever the stamen is lacking, two pistils in the same axil. Filaments elongated ; anthers reniform, two-celled, dehiscing by side slits which finally flow into one across the top. Styles two, filiform, papillose. Fruit sessile or on peduncles, which in some species are greatly elongated at maturity, compressed, four-celled, more or less winged or keeled on the margins, four-lobed, the lobes united in pairs so as to form two discs with a groove between them, separating at maturity into four flattish carpels, each containing a single seed.

Fruit pedunculate.

Perigonium none.

Peduncles minute, ¼-½ mm. long.

1. *C. deflexa*, var. *Austini*.

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* See his article in Bot. Gaz., 13, 296.

Peduncles stout, spreading, 2-5 mm. long.
2. *C. marginata.*

Peduncles deflexed, 2-5 mm. long, fruit rooting in the mud.

Leaves spatulate, three-nerved. 3. *C. Nuttallii.*

Leaves linear, one-nerved. 4. *C. sepulta.*

Enclosed in a perigonium. Peduncles very long.
5. *C. longipedunculata.*

Fruit sessile.

With a perigonium.

Fruit oblong, narrowly winged on the apical margin, flat on the face, styles shorter than the fruit and deciduous. 6. *C. verna.*

Fruit obovate, wings nearly wanting, plano-convex on the face. Styles longer than the fruit, persistent.
7. *C. heterophylla.*

Fruit with broad membranous wings which run around the entire margin. Styles elongated, deciduous.
8. *C. stenocarpa.*

Fruit orbicular, margins obtuse. Styles elongated, mostly deciduous. 9. *C. Bolanderi.*

Without a perigonium.

Leaves all submerged and linear. 10. *C. autumnalis.*

Leaves all spatulate. Fruit curiously gibbous at the base.
11. *C. peploides.*

1. *C. deflexa.* Braun, var. *Austini.* Hegelm. Verhandl. Bot. Brand. p. 17 (1867).

C. Austini. Englm. Gr. Man. Ed. 5, 428 (1867).

Terrestrial, 2-4 cm. high, growing on damp soil in shady woods. Leaves spatulate or obovate, three-nerved, 3-4 mm. long and nearly or quite 2 mm. broad, tapering at base into a short margined petiole. Fruit about $\frac{5}{10}$ mm. long by $\frac{8}{10}$ mm. broad, deeply notched at both ends; lobes with a narrow marginal wing or raised border and a deep groove between them; usually with a minute peduncle nearly or quite their own length. Styles persistent, shorter than the fruit, spreading or reflexed. The dried plant exhales a pleasant odor like that of *Melilotus.*

Several forms occur in Brazil, distinguished mainly by the length of the peduncle, the one regarded by Hegelm. as the type with peduncles 3-5 mm. long, and fruit somewhat larger than in ours.

New York to Washington, D. C., west to Missouri, Arkansas, Louisiana and Texas, Central and South America.

2. *C. marginata.* Torr. Bot. Whip. Ex. 135 (1856). Hegelm. Verhand. Bot. Brand. 9, 12 (1867.)

Amphibious, usually floating, sometimes growing in mud. Submerged leaves linear, one-nerved, running gradually into the emersed, which are oblanceolate or spatulate, and three-nerved, the blade 4-6 mm. long and about 2 mm. broad. Styles as long as or shorter than the fruit, reflexed, deciduous. Fruit 1-1¼ mm. long and 1½-1¾ mm. broad, with conspicuous membranous wings and divergent lobes.

Peculiar to the Pacific coast from Arizona to California. Also attributed to Chili.

3. *C. Nuttallii.* Torr. Bot. Whip. Ex. 135 (1856).

C. pedunculosa. Nutt. Trans. Am. Phil. Soc. Vol. V, n. s. 140 (1837) not Arnott nor *C. pedunculata*, D.C.

A small terrestrial species growing in moist grounds. Leaves all spatulate, three-nerved, the blade 3 or 4 mm. long and 1-1½ mm. broad, often finely wrinkled or granulated, apparently without stellate scales. Fruit thick, deeply emarginate at apex and base, ⅗-⅘ mm. in length and ⅘-1 mm. in breadth, the lobes with narrow marginal keels. Styles erect, longer than the fruit, deciduous. This and the following species are peculiar in bearing the fruit on reflexed peduncles and burying it in the mud.

First discovered by Nuttall in Arkansas and described by him under the name *C. pedunculosa*, but, unfortunately, the name had been already preoccupied.. It extends down the Mississippi to Louisiana. (Hale, Langlois.)

4. *C. sepulta.* S. Watson. Proc. Am. Ac. 14, 298 (1879.)

A small terrestrial prostrate species, similar in general appearance and habit to the preceding. Leaves linear, one-nerved, 3-5 mm. long, somewhat wrinkled or granulated below, as in *C. Nuttallii*, and apparently without stellate scale. Styles elongated, reflexed, soon deciduous, Fruit thick, about ¾ mm. long and

1 mm. broad, with very narrowly winged, divergent lobes, deeply emarginate at both ends, usually somewhat smaller than in the preceding species.

Oregon. Coll. E. Hall (No. 459) 1871.

5. *C. longipedunculata*, n. sp.

With thread-like stems; leaves all spatulate or oblanceolate, 3-8 mm. long, the blades 1-2 mm. broad, rounded at the apex and sloping into narrowly margined petioles often longer than themselves, dotted with stellate scales, three-nerved, the lateral nerves running into each other very near the apical margin. Perigonial sacs longer than the fruit. Styles much longer than the fruit, erect, deciduous. Peduncles lengthening to 10-25 cm. at maturity, and frequently two or three proceeding from the same axil, or a little below it. Fruit thick, nearly orbicular ⅗-1 mm. long by about ⅘ mm. in breadth, minutely emarginate, the lobes divergent, with a deep intervening groove, obtusely margined, and with or without a very narrow wing. Nearly allied to a species in the Torrey Herbarium from Constantinople labelled "*C. muscoides*, Goldbach," which has peduncles nearly as long, but with different leaves and fruit. A well marked species, collected in 1884 by C. R. Orcutt, on mesas, San Diego, California.

6. *C. verna*. L. Fl. Suec. ed. 2, 2 (1755.)

C. vernalis. Koch. Syn. ed. 1, 245 (1837) not Kütz.

Chiefly aquatic, and quite variable. Leaves of two kinds, the submerged narrow, linear, one-nerved, retuse or bifid, 10-20 mm. long, gradually changing into the emersed, which are three-nerved, 8-12 mm. long, the blade 3-4 mm. broad, spatulate or obovate, rounded and truncate or retuse at the apex, narrowing into a margined petiole, and profusely dotted with stellate scales. South American forms figured by Hegelm. have rhomboid-spatulate leaves. A terrestrial form, growing in places from which the water has receded, much smaller and more compact, has tri-nerved, obovate leaves 3-4 mm. long, and 1-2 mm. broad. There is also an entirely submerged form with the leaves all linear.

Styles chiefly shorter than the fruit, spreading, deciduous. The typical fruit of this species is oblong in shape, 1-1¾ mm.

long and ¾-1 mm. broad, flat on the face, mostly with a small apical notch and narrow apical wings, the grooves between the lobes deep. The fruit often varies from oblong to obovate, thus approaching the character of the following species.

To the terrestrial form of this species have been referred *C. brevifolia*, Pursh., and *C. terrestris*, Raf., and to the submerged form *C. linearis*, Pursh., but no one can tell without an examination of their specimens whether these authors had this or the following species in mind.

A wide-spread species, but most common in Northern waters. It occurs throughout the Dominion of Canada, and in nearly all parts of the United States. Found also in South America, Europe and Asia.

7. *C. heterophylla.* Pursh. Fl. Am. 1, 3 (1814.)

C. Asagrayi. Hegelm. Monog. p. 54 (1864.)

Very similar to No. 6 in general appearance, foliage and habits; like that it has terrestrial, submerged and intermediate forms. Fruit smaller, $\frac{3}{5}$-1 mm. long by $\frac{4}{5}$-1$\frac{1}{5}$ mm. broad, generally obovate, with a deep, broad notch at the apex, thick, almost ventricose near the base, lobes obtusely angled, with a small groove between them, wingless or with a narrow wing or raised border on the upper margin; stigmas usually longer than the fruit, erect, more or less persistent.

Frequently confounded with *C. verna.* After examining many private collections, and finding fault with the collectors for badly mixing up the two species, I was somewhat taken aback, as well as much amused, upon re-examining my own specimens collected some years since, to find that nearly all which I had marked *C. verna* were *C. heterophylla.*

This species is more common than the foregoing in Southern waters, but it occurs in Canada, and ranges from New England to Florida and Louisiana, and west to Missouri and Colorado.

8. *C. stenocarpa.* Hegelm. Verhand. Bot. Brand 10, 114 (1868?).

Floating leaves 10–12 mm. long, obovate, rounded and entire at the apex, three-nerved, the blade 8-10 mm. long and about 4 mm. broad, tapering into a short, margined petiole, marked with stellate scales. Submerged leaves linear. Styles erect, twice as long as the fruit, deciduous. Fruit flat, with a well marked wing on the lobes which runs into the apical notch and all around the margins, 1⅕-1⅖ mm. long and 1-1⅕ mm. broad. The fruit is thinner than in *C. verna*, and the lobes less divergent, the groove about as deep. Collected by Prof. E. L. Greene near Donner Lake, Sierra Nevada, California.

9. *C. Bolanderi.* Hegelm. Verhand Bot. Brand 10, 114 (1868 ?).

Usually more branching, with larger stems and leaves than in *C. verna*, but similar to that species in general appearance and habit. Floating leaves obovate or rhombic-obovate. Fruit orbicular or slightly obovate, 1-1½ mm. in diameter, or sometimes a little longer than broad, the lobes scarcely winged, with sharp or obtuse closely approximated margins. Styles twice as long as the fruit, erect, persistent or subpersistent. A Pacific coast plant, occurring at Vancouver's Island, and other places in British Columbia, Oregon, (Hall No. 460), Washington, Placer County, (Bolander) and other places in California.

10. *C. autumnalis.* L. Sys. Nat. 2, 52, No. 13 (1767).
C. angustifolia. Hoppe. Bot. Tasch. 155 (1792).
C. virens. Gold. Act. Mosq. 5, 119 (1817).

Plant entirely submerged, very bright green when fresh, often growing in rapids. Leaves entirely destitute of stellate scales, crowded on the stem, linear-lanceolate, broader and clasping at the base, retuse or bifid at the apex, one-nerved, 10-15 mm. long. Styles about as long as the fruit, reflexed and soon deciduous. Fruit sessile or occasionally on a minute peduncle, slightly narrower than long, or orbicular, 1-2 mm. in diameter, the lobes with a deep groove between them which extends half way to the centre of the fruit, and broad wings on the margins.

Extensively diffused in northern regions. Common in Canada and British Columbia. It occurs in western Massachusetts, (Gr. Man. Ed. 6) Lake Champlain (Pringle), Sault Ste. Marie (Morong), South Colorado (Brandegee), and Harney Valley, Oregon (Howell).

11. *C. peploides.* Nutt. Trans. Phil. Soc. n. s. 5, 141 (1837).
C. Drummondi. Hegelm. Monog. 60 (1864).

A small species, creeping in mats 2-4 cm. upon moist ground, often under the shade of dwelling houses. Leaves all obovate or oblanceolate, 2-5 mm. long, ½-3½ mm. broad, the blades rounded at the apex and tapering into a short petiole, three-nerved. Style as long as or longer than the fruit, erect, deciduous or persistent. Fruit very small, sessile or on a minute peduncle, entirely unlike that of any other species, being only about $\frac{3}{5}$ mm. long by $\frac{4}{5}$ mm. broad, the lobes separated by a deep and broad apical notch, the groove between them small, the margins obtuse and wingless, contracting at the base into a raised, gibbous projection. The dried plant has a fragrance like that of No. 1.

Florida, Arkansas, Louisiana, Texas. Also in Cuba (Wright., Rugel, No. 234).

3. *Proserpinaca.* L. Act. Up. 81 (1741).

Well-known marsh or aquatic plants readily recognized by their three-celled bony triquetrous fruit. It should be noted, however, that the flowers are in rare cases four-parted, and when this occurs, the fruit is four-gonous, four-celled and four-seeded. The inflorescence is in the axils of the emersed leaves. Two species only are known, confined to North America.

Emersed leaves linear or linear-lanceolate, sharply serrate, the submerged pectinate or pectinate-pinnatifid. Fruit sharply three angled, the faces concave and usually smooth. 1. *P. palustris.*

Leaves all pinnate or pinnatifid. Fruit smaller, angles obtuse, the faces flat or slightly convex, apt to be wrinkled or tuberculate. 2. *P. pectinata.*

1. *P. palustris.* L. Sp. Pl. 88 (1753).

Trixis palustris. Gaert. De Fruct. 115, t. 24 (1788).

The submerged plants of this species may be distinguished from those of the following by the fact that the segments are commonly denticulate, and bear minute black spines in their axils, while this seldom occurs in the other.

Common in Canada, New England south to Florida, New Mexico and Gautemala, west to Minneapolis and Iowa, Cuba (Wright).

2. *P. pectinata.* Lam. Ill. t. 50, f. 1 (1791).

P. pectinacea. Torr. and Gray Fl. 1, 76 (1838). Gray Man. Ed. 6 182 (1890) not Lam.

This plant grows about as high as the preceding (20-50 cm.)

but with a more limited range, occurring in sandy ponds along the Atlantic coast from Southern New England to Florida and Louisiana.

In order to compare the number of spinulose teeth in the submerged leaves of the two species, fourteen of each were taken at random and examined. In *P. palustris* thirteen plants had them on nearly all the leaf segments and one bore them occasionally, while in *P. pectinata* eleven were entirely destitute of them, and three showed them occasionally, and these so minute as to be scarcely discernible under a lens.

4. *Myriophyllum.* L. Gen. Pl. n. 724 (1737).

Leaves for the most part verticillate (alternate in No. 4), the emersed bract-like, entire, toothed or pectinate, the submerged long, pectinate-pinnatifid, with fine capillary divisions. Flowers axillary, commonly monoecious, the staminate above with a very short calyx tube, and two to four-lobed limb or none. Petals two to four. Stamens four to eight. The intermediate flowers not unfrequently perfect. Calyx of the fertile flowers with a more or less deeply four-grooved tube, and four minute lobes or none. Ovary two to four-celled, having a single pendulous ovule in each cell. Styles four, short, often plumose and recurved. Drupe four-sided, splitting at maturity into four crustaceous, one-seeded, indehiscent carpels, which are smooth, angled or tuberculate on the back.

Fifteen or twenty species are known, inhabitants of fresh water in all parts of the world, both in the tropics and the frigid zone.

Twelve species occur in North America, which may be briefly characterized as follows:

Carpels smooth.
  Flowers on emersed spikes.
    Floral leaves shorter than the flowers. Spikes nearly naked.
      Flowers in verticils. 1. *M. spicatum.*
      Flowers alternate, or subverticillate below. 2. *M. alterniflorum.*
    Floral leaves longer than the flowers, pectinate-pinnatifid. 3. *M. verticillatum.*

Floral leaves reduced to minute bracts. 4. *M. tenellum.*

Flowers on both emersed and submersed stems.
5. *M. humile.*

Flowers on submerged stems. 6. *M. proserpinacoides.*

Carpels ridged or rough.

Flowers on emersed spikes.

Floral leaves ovate or lanceolate, serrate or entire.
7. *M. heterophyllum.*

Floral leaves linear-lanceolate, serrate or entire. Pacific coast plants. 8. *M. hippuroides.*

Floral leaves linear, pectinate toothed. 9. *M. pinnatum.*

Floral leaves pinnately parted, longer.
10. *M. Mexicanum.*

Floral leaves reduced to minute, nearly entire, spatulate bracts. 11. *M. laxum.*

Flowers on submerged stems. 12. *M. Farwellii.*

1. *M. spicatum.* L. Sp. Pl. 992 (1753).

Submerged leaves in whorls of fours and fives, the capillary divisions usually coarser than in No. 2 and No. 3. Floral leaves ovate, entire or toothed, commonly shorter than the flowers, sometimes none, leaving the spike nearly or quite naked. Spike 3-7 cm. in length. Petals four, deciduous. Stamens eight. Fruit 2½ mm. long and 2-3 mm. broad. Carpels rounded on the back, with a deep, wide groove between them. Very rarely the carpels are somewhat rugose. A deep water plant.

Common in Canada from Bear Lake to Newfoundland, New England to Minnesota, Utah and California, south to Florida. Common in Europe.

2. *M. alterniflorum.* DC. Fl. Fr. Supp. 529 (1805). Prod. 3, 68 (1828).

Submerged leaves usually in whorls of threes and fives, occasionally scattered, 6-10 mm. long, eight to ten pairs of pinnæ, the whole outline of stem and leaves narrow, 5-15 mm. in width. Spikes short, 3-5 cm. long, numerous on the branching stems. Uppermost floral leaves minute, ovate or linear, entire or minutely toothed, smaller than the flowers, early deciduous, leaving the fruiting spike naked. All the uppermost floral leaves and flowers alternate. Staminate petals four, longer than the stamens, oblong, pale, rose-colored, deciduous. Stamens eight. Fruit looking like a square block, 1½ mm. long and broad. Carpels turgid, rounded on the back with a deep intervening groove. A deep water plant.

Greenland, Lake Termiscouata (Northrop), and Lake Memphremagog, Canada, near the United States boundary (Churchill). Common in Europe.

3. *M. verticillatum.* L. Sp. Pl. 992 (1753).

Submerged leaves in crowded verticils of threes and fours, 1 to 4 cm. long, the capillary divisions ten to twelve pairs, often minutely scabrate. Floral leaves pectinate-pinnatifid, or pectinate, much longer than the flowers. Petals four, purplish in color on the sterile flowers. Stamens eight. Fruit 2 to 3 mm. long, and 2½ mm. broad, somewhat gibbous at the base.

In deep and shallow water. Ontario (Macoun's Cat.). Same range in United States as No. 2. Common in Europe.

4. *M. tenellum.* Big. Fl. Bost. 346 (1824).

Stems slender, scape-like, nearly leafless, simple, erect, 4 to 35 cm. high, nearly all out of the water, from a long rhizome, which sends up many sterile shoots. Flowers alternate, solitary, subtended by small, entire bracts, the uppermost obovate and often longer than the flowers, the lower oblong and generally shorter than the flowers, the lowest part of the spike often bractless. Stem with scattered bracts or often naked. Staminate petals four, longer than the stamens, somewhat persistent, purplish in color. Stamens four. Fruit 1 mm. long and 1 mm. broad at the apex, spreading to 1½ mm. at the base. Carpels rounded or obtusely angled on the back, the groove shallow.

Frequent in Canada, New England, New York, Pennsylvania, and west to Michigan.

5. *M. humile.* (Raf).

Purshia humilis. Raf. Med. Rep. 2nd. Hex. 3, 422 (1806).
M. ambiguum var. limosum., Nutt. Gen. 2, 212 (1818). Torr. Comp. 355 (1826). Gr. Man. Ed. 1, 140 (1848).

This plant occurs in several forms according to the situation in which it grows. These forms, when seen only in dried herbarium specimens, might be easily mistaken for distinct species, so different are they in general appearance. Each of them has received a varietal name, but they can hardly be considered as anything more than forms or states, as they readily run into each other when the conditions change.

The type of Rafinesque, commonly called by late authors var. *limosum*, is entirely terrestrial, rooting in the mud upon the shore, 2 to 4 cm. high, leaves much longer than the fruit, alternate, linear, and entire or more commonly pectinate, sometimes pinnatifid. Fruit minute, slightly more than 1 mm. long and 1 mm. or less in breadth. Carpels usually smooth, sometimes a little rough, the groove small. Petals four, purplish. Stamens four. This form appears to be the offspring of the floating plant which often roots in the mud where it is cast ashore, and sends up an erect flowering stem, frequently leaving traces of the old submerged leaves below the rooting node.

The form called *M. ambiguum* var. *natans* by Dr. Gray (Man. Ed. 1, p. 140) and which he seems to have considered the type, is intermediate between the type and the so-called var. *capillaceum*. It usually occurs in still, shallow water, with a spike of flowers and the typical floral leaves above the surface, and subverticillate or, more commonly, scattered pinnatifid leaves beneath; the divisions are few. On specimens of this from the herbarium of Mr. Oakes, marked by him *M. capillaceum*, Nutt., I find spikes nearly 30 cm. long. When botanizing on Nantucket in the summer of 1887, I found these aquatic forms together in some of the small ponds, growing in such profusion that they were literally in heaps. A note sent to Mrs. Owen, and published on page 26 of her interesting catalogue of the plants of the island, will show how intimately associated they are.

"In both these ponds the plant is at first var. *capillaceum* while immersed, but very soon it gets its head above water and immediately forms pectinate leaves—that is becomes the type as described in Gray's Manual. I have plenty of specimens in both conditions which grew together."

The form called *M. ambiguum* by Nutt. (Gen. 2, 213) and *M. ambiguum*, var. *capillaceum* by Torr. & Gray (Fl. N. A. 1, 543) and other authors, is commonly a deep water plant, entirely submerged. Stems long, widely branching, very plumose when growing, leaves all pinnatifid with hair-like divisions, subverticillate or scattered. It rarely flowers or fruits, and when it does the inflorescence may be seen scattered here and there in the axils of the leaves. One or more of the forms occur from eastern Massachusetts to Maryland and Tennessee, and west to Illinois and Indiana.

6. *M. proserpinacoides.* Gill. in Hook. Bot. Misc. 3, 313 (1833).

This is a South American species introduced from Chili or Buenos Aires, where it is a native. It has partially naturalized itself in Hopkins' pond, near Haddonfield, and other places in New Jersey, and seems to be spreading. All the plants occurring in our waters appear to have sprung from stock imported several years ago by the florist, Mr. E. D. Sturtevant, of Bordentown, New Jersey, who writes that "it is entirely hardy here, below the reach of ice or frost."

Hooker describes it as monoecious and diœcious. I have seen only pistillate plants. These are very vigorous, 10 to 40 cm. high, even lifting themselves out of the water and growing quite as well above as below it. Normally, however, it seems to be a submerged plant. Leaves all alike, smooth, glaucous, pectinate-pinnatifid, in crowded verticils of fives, 15 to 20 mm. long, pinnæ linear, twenty to twenty-five in number, the pairs opposite or subopposite, each segment about 5 mm. long, and sharply pointed. Stamens said by Gillies to be eight. Pistillate flowers axillary, about 1 mm. high, without petals, with four white plumose stigmas. Fruit not seen, but as indicated by the ovaries, the carpels should be smooth. Between the bases of the leaves and among the flowers are many small white trichomes, or hair-like bracts.

7. *M. heterophyllum.* Michx. Fl. 2, 191 (1803).

Potamogeton verticillatum. Walt. Fl. Car. 90 (1788).

Floral leaves in whorls of threes and fives, linear, ovate or lanceolate, serrate or rarely entire, much longer than the flowers, sometimes as much as 18 mm. in length and 4 mm. broad; submerged leaves verticillate or subverticillate, crowded, about 2 cm. long, with six to ten pairs of capillary pinnæ. The flowering spike occasionally attains the length of 40 or 50 cm. Petals somewhat persistent. Stamens four, very rarely six. Fruit 2 mm. long and 1½ to 1¾ mm. wide. Carpels two-keeled and usually a little scabrate on the back.

Ontario, New York, south to Florida, New Mexico and Mexico, west to Ohio and Minnesota.

8. *M. hippuroides.* Nutt. in Torrey and Gray Fl. 1, 530 (1840).

M. scabratum. Cham. Linnæa 4, 506, not Michaux.

Leaves in whorls of fours and sixes, sometimes scattered, the floral 8 to 12 mm. long, linear-lanceolate, serrate or dentate, uppermost nearly or quite entire, lowest pinnatifid; submerged, with six to eight pairs of capillary pinnæ. Monoecious, but occasionally with only one kind of flowers on the stems, and so appearing diœcious. Petals often pink-colored, sub-persistent. Stamens four. Fruit about 2 mm. long by 1 mm. or a little more in breadth; carpels keeled and somewhat rough, with a deep groove between them. A western form nearly allied to our Atlantic *M. heterophyllum.* Coll. by Nuttall and Hall in the Wahlamet ponds, and by Howell at Sauvie's Island, Oregon, and by Chamisso near San Francisco, E. L. Greene, Stockton, and A. B. Simonds at Clear Lake, California.

9. *M. pinnatum.* (Walt.)

Potamogeton pinnatum. Walt. Fl. Car. 90 (1788).

M. scabratum. Michx. Fl. 2, 190 (1803), and most American authors.

Leaves in whorls of threes and fives, sometimes scattered, the floral linear, pectinate, toothed or cut-serrate, the teeth comparatively few, 5 to 15 mm. long, gradually changing into the submerged, which are in crowded verticils, the capillary pinnæ sparse. Spikes 10 to 20 cm. long. Petals purplish, somewhat persistent. Stamens four, very rarely six. Mature fruit about 1¾ mm. long, and 1¼ mm. broad. Carpels strongly two-keeled and scabrate on the back, the grooves deep.

Shallow water, Rhode Island to Florida, Louisiana, Texas and Missouri.

10. *M. Mexicanum.* S. Watson Proc. Am. Ac. 25, 148 (1890).

Stems stout, much branched. Leaves in verticils, or subverticils of fours and fives, or scattered, the floral pinnatifid or toothed, the divisions remote, 10 to 15 mm. in length; submersed pinnatifid, 20 to 30 mm. long, the divisions finely capillary, very long, in seven to ten pairs. Spikes 10 to 30 cm. in length, their lower portion often submerged.

A few of the intermediate flowers perfect. Petals oval, rose-colored. Stamens four. Fruit in specimens sent by the collector, Mr. Pringle, about 2 mm. long by 1 to 1½ mm. broad, the carpels sharply angled and ridged and occasionally scabrate on the back, with a deep, narrow groove between them.

No. 2,017, Pringle, Chihuahua, Mexico, Oct., 6, 1888.

11. *M. laxum.* Shutt. in Chapman Fl. 143 (1860).

Leaves in whorls of fours, the floral usually shorter than the flowers, the lowest pectinate-toothed or pinnatifid, the uppermost entire, linear or narrowly spatulate, sometimes all of them minute, leaving the spike apparently naked; submerged 10 to 20 cm. in length, the capillary divisions about five on a side, and placed irregularly on the rachis. Petals pink, sub-persistent. Stamens eight. Fruit nearly 2 mm. long, by 1¼ mm. wide; carpels rounded on the back, strongly tuberculate-rugose.

Ponds in middle and west Florida (Chapman).

12. *M. Farwellii.* Morong.

Recently published in these columns—BULL. TORR. BOT. CLUB, for May, 1891. Collected by O. A. Farwell on the Keweenaw Peninsula, Michigan.

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 20.

New or Noteworthy North American Phanerogams.—IV.

BY N. L. BRITTON.

Reprinted from Bulletin of the Torrey Botanical Club, Vol. XVIII, No. 9, Sept. 1891.)

New or Noteworthy North American Phanerogams.—IV.

By N. L. Britton.

Ranunculus pedatifidus, Smith in Rees. Cyclop. No. 72 (1819).
R. affinis, R. Br. in Bot. App. Parry's First Voyage, 265 (1823).

Smith gives a very good account of the plant, saying that there are four specimens of it in the Linnæan Herbarium, and that it is a native of Siberia. It is now known to inhabit both northern Asia and North America. The specimens are still in the Linnæan Herbarium.

Var. CARDIOPHYLLUS (Hook.), (*R. cardiophyllus*, Hook. Fl. Bor. Am. i. 14 (1830); *R. affinis*, var. *cardiophyllus*, A. Gray, Proc. Acad. Phil. 1863, 56), the state of the species with entire or nearly entire radical leaves, appears to bear a similar relation to it as *R. micranthus*, Nutt. does to *R. abortivus*, L.

RANUNCULUS GRAYI.

Ranunculus pedatifidus, Hook. Fl. Bor. Am. i. 18 (1830), not of Smith (1819).

R. Hookeri, Regel, Fl. Ost. Sib. i. 47 (1862), not of Schlecht. Linnæa, ix. 610 (1834).

Schlechtendahl's *R. Hookeri* is a Mexican species.

ISOPYRUM, L. Gen. Pl. Ed. 2, 245 (1742).
Coptis, Salisb. Trans. Linn. Soc. viii. 305 (1803).

Isopyrum and *Coptis* have been kept separate by recent authors, the character depended upon for their distinction being the sessile follicles of the one and the stipitate follicles of the other. Baillon (Hist. Pl. i.) has referred *Coptis* to *Helleborus*, L. under which genus the typical species *H. trifolius*, L. was first described, and except for the vegetative characters it is certainly closely related to this genus. But taking all the known species together it seems to me more desirable to unite *Coptis* with *Isopyrum*. *Isopyrum stipitatum*, A. Gray, of the Northwest contains in itself the characters of the two genera. Our Eastern species *Helleborus trifolius*, L., will then become I. TRIFOLIUM (L).

NECKERIA, Scop. Introd. Hist. Nat. 313 (1777).
Corydalis, Vent. Choix. Pl. Cels t. 19 (1803).

This, as pointed out by Pfeffer, (Bot. Zeit. xv. 643), is the first post-Linnæan name applicable to these plants, Linnæus having regarded them as species of *Fumaria*. The pre-Linnæan name was *Capnoides*, but this was taken up by Rupp, (Flora Jen. Ed. 2,268 (1745)), for the South African plant subsequently described by Linnæus as *Fumaria vesicaria* and on which the genus *Cysticapnos* of Gærtner is based.

If we are to follow the opinion of Bentham and Hooker, as expressed in Gen. Pl. i. 56, that the South African species is congeneric with those of the northern hemisphere, then *Capnoides*, Rupp., should be applied to them all; but this plant appears to me to have sufficient characters to rank as a valid genus. I am quite aware that the adjective termination *oides* for genera, has been objected to by many authors, but it is in frequent use in zoology, and was freely used by pre-Linnæan botanists (*Cyperoides*, Tourn. =*Carex*, L., for example), and is no more adjective than *Gloriosa* L., or *Impatiens*, L., which are in common use. Scopoli's name *Neckeria* will prevent *Neckera*, Hedw. Fund. Hist. Musc. ii. 93 (1782), being used for the genus of Mosses, which has, however, received the name *Paraphysanthus*, Spruce, while *Neckeria*, Gmel. Syst. ii. 16 (1791) is the same as *Pollichia*.

Neckeria has been adopted for *Corydalis* by Mr. N. E. Brown of Kew, in his forthcoming supplement to the English Botany, and to him I am indebted for the reference to Rupp's work.

BIKUKULLA, Adans. Fam. Pl. ii. 23 (1763).

Diclytra, Borckh. in Roem. Arch. i. Pars. 2, 46 (1797).
Cucularia, Raf. Med. Rep. (II) v. 352 (1808).
Dicentra, Bernh. Linnæa, viii. 468 (1833).
Eucapnos, Bernh. loc. cit. (1833).

The adoption of Adanson's name for the plants which have recently been generally known as *Dicentras*, will happily solve the question as to the misspelling of Borckhausen's *Diclytra*. There can be no doubt of what Adanson meant, his description being clear, and his reference to Plukenet's Plate 90, fig. 3, being consulted shows this to be a pretty good representation of our *Dicentra Canadensis*. Adanson's name is based on Bicuculata, March. Mem. Acad. Paris, 1733, t. 20.

Nasturtium hispidum (Desv.) DC. Syst. ii. 201 (1821).

Brachylobus hispidus, Desv. Journ. Bot. iii. 183 (1814).

Nasturtium palustre, var. *hispidum*, A. Gray, Man. Ed. 5 (1867.)

I am satisfied that this is a distinct species from the European *N. palustre*, and in this conclusion I am strengthened by the opinions of such close observers as Mr. Bicknell and Professor Macoun. The plant is apparently strictly East American in distribution, and is one of the commonest Crucifers in our territory. *N. palustre* is rarely met with and occurs only in situations where it has been introduced. It can readily be distinguished from *N. hispidum* by its linear pods which are 4-6 times as long as thick, and by the nearly entire absence of pubescence on the stem and branches, *N. hispidum* having globose-ovoid pods, and usually considerable hirsute pubescence.

The status of the Northwestern and Rocky Mountain plant which has also been referred to *N. palustre* is more uncertain. It is commonly larger than European *palustre*, has, I believe, larger flowers and still longer pods. Professor Macoun is inclined to consider it a distinct species, but the specimens at my command do not convince me of the correctness of this view. It is certainly closer to *palustre* than *hispidum* is, and shares the pecularity of many Rocky Mountain species in more nearly resembling European plants than do those of the eastern half of the continent.

Arabis lyrata, L. Sp. Pl. 685 (1753).

Cardamine spathulata, Michx. Fl. Bor. Am. ii. 29 (1803).

Under these circumstances it will no longer seem strange that Michaux's species which came from the Southern Alleghenies, and of which the type is preserved at Paris, has never since been found.

CORONOPUS, Hall. Helv. 1. 217 (1768), fide Baillon, Hist. Pl. iii. 286: Gærtn. Fruct. et Sem. ii. 293, t. 242 (1791).

Senebiera, D.C. Mem. Soc. Hist. Nat. Paris, vii. 140, t. 89 (1799).

The earliest specific names of the two species occurring in North America may be indicated as follows:

1. *Coronopus didymus*, (L.), Smith, Fl. Brit. iii. 691 (1800).

Lepidium didymum, L. Mant; 92 (1767). *Lepidium Anglicum*, Huds., Fl. Angl. Ed. 2. 280 (1778). *Senebiera didyma*, Pers. Syn. ii. 185 (1807).

2. CORONOPUS CORONOPUS, (L). *Cochlearia Coronopus*, L. Sp., Pl. 648 (1753). *Nasturtium verrucarium*, Gars. Fig. Pl. t. 402 (1767), fide DC. *Senebiera Coronopus*, Poir. in Lam. Encycl. vii. 76 (1806).

Linnæus employed the generic name in the first edition of his Systema, (1835), but that is a mere list of genera.

POMBALIA, Vandelli Fasc. Pl. 7 (1771).

This long antedates *Ionidium* as a generic name, for the latter was not published until 1803 (Vent. Hort. Malm. 27, t. 27).

Pombalia is based on the South American plant commonly known as *Ionidium Ipecacuanhæ* which Vandelli described as *Pombalia Ipecacuanhæ*, giving a very good figure of it. There seems no good reason, then, for not using the older name. As to related genera, *Solea*, Spreng, as also older than *Ionidium*, dating from 1800, and was thought by Dr. Gray to be distinct, although united with *Ionidium* by Bentham and Hooker. *Hybanthus*, Jacq. Enum. Carib. 2 (1760) is the oldest named of the group, based upon the spiny plants of the West Indies, and Baillon unites them all under this name. But if we follow Dr. Gray in keeping up *Hybanthus*, (Bot. Gaz. xi. 293), then the next oldest name is *Pombalia*.

Silene Caroliniana, Walt. Fl. Car. 142 (1788).

Silene Pennsylvanica, Michx. Fl. Bor. Am. i. 272 (1803).

There is a specinen of this plant in Walter's Herbarium, marked " Silene an Virginica," evidently a type of his description, which fits it exactly. In the Linnæan Herbarium there is also a specimen of it marked *Virginica*, by Linnæus, but pinned fast to the sheet is another bearing a good specimen marked only " K," indicating that it was received from Kalm, of the *S. Virginica* of the description in Species Plantarum, 419. Linnæus evidently did not distinguish the two species.

CERASTIUM ERECTUM (L).

Sagina erecta, L. Sp. Pl. 128 (1753).

Cerastium quaternellum, Fenzl, Verbr. Alsin. syn. table p. 18 (1833).

This species, which was included in the earlier editions of Gray's Manual, but omitted in the 6th edition, is represented in the Kew Herbarium by abundant specimens collected by Drummond years ago at Philadelphia, and in the Torrey Herbarium by specimens from Baltimore. It does not appear to have been recently found in the United States.

Rhus typhina, L. Amœn. Acad. iv. 311 (1760).
Datisca hirta, L. Sp. Pl. 1037 (1753).

The type of *Datisca hirta* preserved in the Linnæan Herbarium is a specimen of the Stag-horn Sumach in the condition of the inflorescence reverting to leaves, a phenomenon which frequently occurs in this and related species. Linnæus had the plant from Kalm, and it was collected at Philadelphia. Although *hirta* is thus the oldest specific name associated with the plant, we are, I think, debarred from using it by the publication of *Rhus hirta*, Harv., as a synonym by Engler in DC. Monog. Phan. iv. 425 (1883), where this is referred to *R. tridentata*, Sond.

KRAUNHIA, Raf. Med. Rep. (II) v. 352 (1808); Steud. Nom. Ed. 2, i. 850.
Diplonyx, Raf. Fl. Ludov. 101 (1817).
Thyrsanthus, Ell. Journ. Acad. Phila. i. 371 (1817).
Wisteria, Nutt. Gen. ii. 115 (1818).

Rafinesque cites *Glycine frutescens*, L., as an equivalent for his proposed genus *Kraunhia*, so there is no question of the plant intended.

CRUMINIUM, Desv. Ann. Sci. Nat. (I) ix. 423 (1826).
Centrosema. Benth. Ann. Mus. Wien. ii. 117 (1840).
Clitoria § *Centrosema*, DC. Prodr. ii. 234 (1825).

The genus is founded on the plant commonly known as *Centrosema Plumieri*, Benth. (*Cruminium giganteum*, Desv.). The North American species is CRUMINIUM VIRGINIANUM (L). *Clitoria Virginiana*, L. Sp. Pl. 753 (1753). *Centrosema Virginiana*, Benth. Ann. Mus. Wein. ii. 120 (1840).

Gleditschia aquatica, Marsh Arb. Amer. 54 (1785).

This, I believe, is the oldest available name for the Water Locust of the Southern States. To be sure, as pointed out by

Prof. Greene, (BULLETIN, xvii. 14), it was called *G. inermis* by Crantz, (Inst. Rei. Herb. 1. 219 (1766), and this name was subsequently used for the tree by Miller and K. Koch; but Linnæus published a *G. inermis* in Syst. Nat. Ed. 10 (1759), as cited in Richter's Codex, p. 1012, and repeated it in Sp. Pl. Ed. 2, 1059 (1763). Although this *G. inermis* of Linnæus was, apparently, a composite species made up of one from Java and the North American *G. triacanthos*, the reference to the Javanese tree by him stands first, and the species is said to come from Java. Hence we are not justified in using the same binomial published seven years later for a different plant.

SPIRÆA RUBRA (Hill).

Ulmaria rubra, Hill, Hort. Kew 214, t. 7 (1769).

Spiræa lobata, Gronov. in Jacq. Hort. Vind. i. 38, t. 88, (1770).

Hill's figure and description clearly indicate that he had this plant in mind rather than *Gillenia stipulata* (Muhl.) Max. Act. Hort. Petr. vi. 228 (*G. stipulacea*, Nutt.), as has been suggested.

Geum Canadense, Jacq. Hort. Vind. ii. 82, t. 175 (1772).

G. Carolinianum, Walt. Fl. Car. 150 (1788).

G. album, Gmel. Syst. ii. 861 (1791).

Jacquin's plate leaves no doubt as to what he intended. There is a fragment of *G. Carolinianum*, Walt. in Walter's Herbarium at the British Museum, which is apparently the same. *G. Canadense*, Murray, Comm. Soc. Goett. v. 33, t. 4, f. B. (1775), is from figure and description clearly *G. strictum*, Ait. Hort. Kew. ii. 217 (1789), of which there is a type preserved in the general herbarium at the British Museum.

Var. FLAVUM (Porter); *G. album*, var. *flavum*, Porter, Bull. Torr. Club, xvii. 21 (1890).

Saxifraga Geum, L. Sp. Pl. i. 401 (1753).

There is a specimen of this species in Durand's Herbarium at Paris, collected by the Rev. Mr. Steinhaur, in Newfoundland. It is erroneously labeled by Durand *S. spicata*, Don. This appears to be the first indication of its occurrence in America.

Parnassia grandifolia, DC. Prodr. i. 320 (1824).

P. Caroliniana, Michx. var. *β.*, Hook. Jour. Bot. i. 194 (1834); T. and G. Fl. N. A. i. 149.

I believe that this southern plant is specifically different from *P. Caroliniana*, Michx. As pointed out by Hooker, the staminodia are very slender and exceed the anther-bearing stamens; the flowers and leaves are usually larger; Hooker further remarks that these characters are retained in cultivation. I have never seen elongated staminodia in our common northern plant, and am very familiar with it in the wild state. The identity of DeCandolle's and Hooker's plants appears to be satisfactorily established. We have it from North Carolina, (Rugel, Dr. Gray) Florida, (Chapman). DeCandolle's plant came from the Cherokee country, and Hooker's from Louisiana. There may be some doubt as to whether this, or what we are calling *Caroliniana*, is really the plant of Michaux, because the specimen of it is missing in his herbarium at Paris.

AMMANNIA KOEHNEI, n. sp. *Ammania humilis*, *β*. T. & G. Fl. N. A. i. 480 (1840).

Erect, glabrous, 6′-20′ high, at length freely branching. Leaves obovate, oblonceolate, or somewhat spatulate, obtuse or obtusish at the apex, the upper ones clasping and more or less auriculate at the base, the lower narrowed and sessile, or tapering into a short petiole; flowers 1-3 together in the axils, sessile; petals purple? fugacious; stamens very short, not exserted; style very short; capsule enclosed by the calyx.

In swamps, Hackensack marshes, New Jersey (Torrey; Leggett) to Florida. Named in honor of the distinguished monographer of the Lythrarieæ, Dr: E. Kœhne, of Berlin. The species cannot be referred to *A. latifolia*, L., which has auriculate, linear-lanceolate leaves and no petals.

Epilobium lineare, Muhl. Cat. 39 (1813).

My remarks on this species in reviewing Professor Trelease's recent Revision of the North American Epilobia (BULLETIN, this volume, p. 226), where I suggested that the name *E. oliganthum*, Michx. (1803) should have been taken for it, are quite wide of the mark, for the original in Michaux's Herbarium is *E. palustre*, L., as determined there by Haussknecht.

Epilobium glandulosum, Lehm.

Professor Trelease included this species in his treatment of the East American members of the genus in the sixth edition of Gray's Manual, but in his Revision, published subsequently, he excludes it from the range of that work, and cites its distribution as only westward. Haussknect evidently based his statement that it occurred eastward on a specimen in Michaux's Herbarium, from Tadousac, Canada, which is so labelled by him.

Tillæa aquatica, L. Sp. Pl. 128 (1753).
T. simplex, Nutt. Journ. Acad. Phil. i. 114 (1817).
Bulliardia aquatica, D.C. Prodr. iii. 382 (1828).

I have carefully compared anthentic specimens of the East American plant with the Linnæan species at London and Paris, and am convinced that the suggestion made in Torrey and Gray's Flora N. A. that they are identical is the actual fact. M. Franchet kindly compared them with me at Paris, and had no hesitation in pronouncing them identical. He also informed me that the European plant occurs on mud, as does the American.

VLECKIA, Raf. Med. Rep. (II) v. 352 (1808).
Lophanthus, Benth. Bot. Reg. xv. under t. 1282 (1829), not Adanson, nor Forster.

Rafinesque gives *Hyssopus nepetioides* as the equivalent of *Vleckia nepetoides*, which plant was long subsequently referred by Bentham to *Lophanthus*. But in addition to the fact that a genus for these plants had been thus established, the name *Lophanthus* had been used by Adanson in Fam. Pl. ii. 194 (1763) for a species of *Nepeta*, and by Forster (Char. Gen. Pl. Insul. Maris Austral. 27, t. 14 (1776), for plants now referred to *Waltheria*. Hence *Lophanthus* is, from my point of view, doubly inapplicable to the genus of Labiatæ.

Rafinesque has named all the American species under his genus in New Flora N. A. and Fl. Telluriana.

UVULARIA, L. Gen. Pl. Ed. i. p. 93, No. 263 (1737).
Oakesia, S. Wats. Proc. Amer. Acad. xiv. 221 (1879).

The characters assigned to the genus proposed by Dr. Watson appear to me to be insufficient to separate it from *Uvularia*. They are all differences of degree rather than kind, and a careful study of all the known species in the field has afforded me no other points of difference on which a genus could be maintained. But whether they be considered as congeneric or distinct, the name applied by him is not available for these plants, because it was previously given by Tuckerman to *Corema Conradii*, Torr. (Hook. London Journ. Bot. i. 445 (1842).

Compliments of the author

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 21.

Notes on the North American Species of Eriocauleæ.

BY THOS. MORONG.

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Notes on the North American Species of Eriocauleæ.

By THOMAS MORONG.

This order is sparsely represented in North America, consisting in fact only of a few outlying members of a tropical family. A single species only is found as far north as Canada, the greater number occurring in the warm sections of the United States. The genus *Lachnocaulon*, however, is endemic in our country, and therefore has a special interest for us. The great bulk of the family is confined to South America, where three-quarters of the three hundred and twenty-five species embraced in it occur. Our own species have been imperfectly investigated and poorly defined, and for this reason the present paper has been prepared in the hope that something may be contributed towards a better understanding of their characters and geographical distribution.

In general aspect these plants may be easily recognized, being very peculiar. The flowers are androgynous or diœcious and contained in more or less hemispherical heads which are enclosed by involucral scales as in the Compositæ. In the place of growth they favor swampy grounds or shallow water, but a few grow in low sandy barrens or fields. In mode of growth they are cæspitose, and new tufts of leaves are added year by year to the stock so that in time quite a little colony is collected about the same caudex, from which scapes, sometimes very numerous, are annually sent up. The scapes are nearly always twisted in the growth, and always marked longitudinally by angles, which are frequently interrupted by intermediate ridges or striæ. As these intermediate ridges are often partial, the number of angles assigned to a scape will vary with the point at which the number is reckoned. This will account for the discrepancy which occurs in the statements of different observers. The large roots are spongy or often conspicuously nodose for their whole length. With three of the genera we have no concern, as two of them, *Philodice* and *Tonina*, both together numbering five species, are restricted to tropical South America, and the other, *Mesanthemum*, numbering three species, is endemic in tropical Africa.

The North American genera may be briefly distinguished as follows:

Segments of the perianth four or six.
Stamens separate. Anthers two-celled. Stamens as many as the perianth segments. 1. *Eriocaulon.*
Stamens one-half as many as the perianth segments. 2. *Dupatya.*
Perianth of three segments. Stamens three, monadelphous below. Anthers one-celled. 3. *Lachnocaulon.*

Eriocaulon is the most extensively diffused genus, being found in tropical and subtropical regions throughout the world. As classified by Körnicke in his monograph the species are divided into fourteen sections. All the species occurring within the borders of the United States, so far as known, are acaulescent or nearly so, the heads single on erect peduncles or scapes, the perianth with one exception four-parted and the stamens four; the Mexican species are the same except in having six-parted flowers and six stamens. The perianth segments, at least the upper ones, are usually spotted with a minute black gland near the centre or the apex. The heads are generally quite villose and grayish in appearance, the parts of the perianth being strongly bearded. The flowers are each subtended by a bract quite similar in markings and general appearance to the perianth segments. Seeds oval, brown when mature and, under the lens, covered with blunt or spiny protuberances.

As the perianth segments are in two series and often separated at a considerable distance, there is much variation in the language applied to them by botanists. Körnicke calls the floral envelopes a double perigonium, the exterior calyculate and interior subcorolline. Kunth speaks of them as a double calyx, while others still regard them as calyx and corolla. The segments of the two series are alternate with each other, sometimes one or both pedicellate or tubular below, sometimes free and separate, often partially or wholly connate.

The floral appendages of these plants constitute a morphological feature of great interest. In *Eriocaulon* the appendage of the staminate flower appears like a style included in and coalescent with the tube of the inner segments, projecting between the bases of the stamens in three small black points which look much like the segmental glands. I do not find this in the pistillate flower. In *Dupatya* and *Lachnocaulon* the appendages are more marked. In the staminate flower they stand up in two or three distinct lobes which are often papillose. In the pistillate flower they are attached to the style in or below the sinuses of the stigmas, apparently enclosing and cohering with the style. Nearly all the botanists who have noticed these appendages regard those of the staminate flowers as rudimentary pistils. Kunth considers them so in both kinds of flowers, but most botanists are content to call those of the fertile flowers merely appendages.

Of the following species seven occur in the United States and five in Mexico, of which two are more particularly described as they approach our boundary near enough to render it probable that sooner or later they will be detected on this side of the border.

1. ERIOCAULON ARTICULATUM (Huds.).

Nasmythia articulata, Huds. Fl. Ang. Ed. 2, i, 415 (1778).
E. pellucidum, Mx. Fl. ii, 166 (1803).
E. septangulare, With. Ar. Br. Pl. ii. 257. (1818); Torr. Bot. N. Y. ii. 335 (1843), and other American authors.

Stem a mere crown. Leaves pellucid, three to eight nerved, fenestrate, acuminate, ½ to 3 inches long, usually equal to the sheaths. Scapes weak, commonly twisted, about seven-angled, smooth, mostly from 4 to 8 inches in height, but sometimes scarely one inch, and when submersed often elongating till they are from 4 to 10 feet long, usually solitary but occasionally clustered. Involucral scales smooth or the innermost bearded at the apex, oblong, obtuse, entire, scarious, of a livid or fuscous tint, usually shorter than the flowers. Heads androgynous, the marginal flowers usually staminate. Bracts cuneate or obovate, abruptly pointed, fuscous above and white bearded, receptacle smooth, flowers about 1¼ lines high, the outer sterile perianth tubular below and its lobes at some distance from the inner, all bearded at the apex. The gland is borne sometimes on the bract and both pairs of segments, and sometimes only on the upper pair. One of the upper pair is generally larger than the other. Fertile flowers scarcely more than half the size of the sterile, the pairs of perianth segments without a tube, and much nearer together than the sterile, all densely bearded.

Still, shallow water, ponds and streams, Newfoundland to Ontario, New England and Minnesota, south to Florida and Texas. Occurs in Great Britain. July to October.

2. ERIOCAULON COMPRESSUM, Lam.

E. compressum, Lam. Encyc. iii. 276 (1789); Körnicke, Linnæa, xxvii. 592 (1854).

E. gnaphalodes, Mx. Fl. ii. 165 (1803), and American authors generally.

Leaves coarsely or finely six to twenty fenestrate-nerved, usually shorter than the sheaths, tapering to a long, sharp point, rigid, or when submerged thin and pellucid, scapes 6 to 35 inches high, smooth, more or less compressed when dry, ten to twelve angled. Involucral scales rounded, obtuse, scarious, shining, smooth, imbricated in three or four rows, heads frequently dioecious, 3 to 6 lines in diameter. Receptacle smooth. Flowers 1½ to 2 lines high. In other respects like the preceding species.

In anthesis the styles and stigmas are much exserted, standing above the heads like projecting threads. The sheaths are obliquely fissured, obtuse at the point, veined like the leaves.

In still, shallow water, ponds and streams, New Jersey to Texas. Cuba. May to October.

3. ERIOCAULON DECANGULARE, L.

E. decangulare, L. Sp. Pl. 87 (1753).

Caudex short and thick, from one to two inches long. Leaves finely many-nerved, or often apparently nerveless, ensiform, tapering to a blunt point, usually much longer than the sheaths, 6 to 20 inches long and 2 to 8 lines broad. Scapes stout, rigid, smooth, ten to fourteen-angled, 1 to 3 feet high. Heads 4 to 8 lines in diameter. Involucral scales ovate, often eroded, dentate at the apex and hairy below. Receptacle hairy, the hairs under the microscope many-celled, appearing acute at the apex or very rarely club-shaped. Flowers about 2 lines high, densely woolly at the base, the bract larger than the flowers acute, white-bearded. Perianth segments spatulate, white-bearded.

Swamps, New Jersey and Pennsylvania to Florida and Texas. Cuba. June to October.

4. ERIOCAULON RAVENELII, Chapm.

E. Ravenelii, Chapm. Fl. 503 (1860).

Very smooth throughout. Leaves linear, very acute, flat, thick or thin and pellucid, finely five to ten-nerved, somewhat longer than the sheaths. Scapes slender, 4 to 5 inches high, clustered, five to six-sulcate. Sheaths obliquely fissured, acute, nerved like the leaves. Heads 1 to 2 lines in diameter. Involucral scales scarious, light straw-colored, oblong, very obtuse. Bracts a little narrower than the scales, often obtusely pointed and denticulate, fuliginous. Flowers scarcely more than ½ line high, fuscous, smooth. Segments of the outer fertile perianth separate, very slender, mucronately pointed; of the inner somewhat broader, minutely toothed. Ovary sessile; style parted into two stigmas. Chapman states that the style is occasionally simple and the seeds minutely pubescent. The specimens which I have examined failed to show either.

Wet grounds, S. C.

5. ERIOCAULON TEXENSE, Körn.

E. Texense, Körn. Linnæa, xxvii. 595 (1854).

Scapes smooth, 8 to 10 inches high, six to seven-sulcate, slender, in the specimens examined solitary. Leaves acuminate, many-nerved, fenestrate, flat, smooth, 1 to 2 inches long, a little shorter than the sheaths. Roots fibrous, the larger ones nodose. Heads hemispherical, 1 to 2 lines in diameter. Involucral scales obovate or nearly orbicular, smooth, entire, straw-colored. Receptacle pilose with silky hairs. Bracts as long as the flowers, cuneate or obovate, the upper part livid, the lower whitish, rounded or more commonly pointed at the apex, hairy on the back and fimbriate at the apex with a coarse white beard. Flowers about 1 line long. Outer perianth segments in the staminate flower free, abruptly acute, slightly longer and larger than the inner, spatulate, fuscous above and bearded. Pistillate flowers bearded similarly to the staminate, the lobes occasionally three; ovary shortly stipitate, dicoccous; stigmas two. The heads appear densely villous. This species is easily distinguished from *E. articulatum* and *E. compressum* by its villose receptacle, and from *E. decangulare* by its smaller stature, its more slender scape, shorter and acute bracts, smaller heads and flowers.

Texas, Drummond, 2nd coll., n. 409.

6. ERIOCAULON KÖRNICKIANUM, Van Heurck & Müll. Arg.

E. Körnickianum, Van Heurck et Müll. Arg. Obs. Pl. Nov. Herb. Van Heurck, 101 (1870).

I have not seen a specimen of this Texan plant, but the authors of the species describe it as having pellucid leaves which are five to seven-nerved, plane, smooth, 8 to 11 lines long and a little over 1 line wide at the base. Scapes numerous, 4 to 5 inches high, setaceous, smooth, compressed, two to three-angled, with lax sheaths which are as long as the leaves. Heads ovoid-globose, about 1½ inch long, a little longer than broad. Involucral scales fuliginous, broadly obovate, irregularly denticulate and white-woolly above, at length slightly recurved. Receptacle smooth. Bracts not quite 1 line high, surpassing the flowers. Sterile flowers about ½ line high; outer perianth segments smooth and black-glandular at the apex; inner obovate and pilose at the apex. Stamens four. Inner perianth segments of the fertile flower white-woolly on the margins. Style two-parted, plainly destitute of appendages. Seeds ellipsoidal, rough papillose.

East Texas. Coll. Charles Wright, in Herb. DC. et Van Heurck.

7. ERIOCAULON MICROCEPHALUM, H. B. K.

E. microcephalum, H. B. K. Nov. Gen. i. 253 (1815); Kunth Enum. 3, 548 (1841).

Small cæspitose plants. Leaves 4 to 8 lines long, acute, five to eight fenestrate-nerved, smooth above, often woolly at the base. Scapes clustered, numerous, 4 to 6 lines high, smooth, four-angled, the angles often separated by finer intermediate striæ. Sheaths shorter than the leaves, rather obtuse at the point. Heads globular, about 1 line in diameter. Involucral scales broadly obovate, entire or denticulate, very light straw-colored, smooth or sometimes scantily fimbriate at the apex. Receptacle smooth. Bracts obovate, acute or obtuse, longer than the flowers, bearded at the apex. Flowers trimerous, a little more than 1 line high. Staminate flowers pedicellate; exterior perianth segments sometimes two only, obtuse, the posterior ones connate in a keeled hood and white pilose at the top; interior segments white, tubular below, three-lobed above, the lobes fimbriate, rounded, denticulate or entire at the apex. Stamens six. Fertile flowers sessile, exterior perianth segments often two only; fuscous above and pilose, the interior more delicate and longer, white, spatulate, obtuse, pilose internally and on the margin. Ovary sessile, three-celled. Style three-parted; stigmas three.

This species has found its way from Jalisco, Mexico, where it is common, to Fort Tejon, California, at which place it was collected by Xantus in the expedition of 1857–8, although it is not enumerated in Dr. Gray's list of Xantus' plants. I find specimens of it without a name in the Torrey Herbarium.

8. ERIOCAULON BENTHAMI, Kunth.

E. Benthami, Kunth. Enum. 3, 545 (1841), originally published by Bentham in his Pl. Hart., p. 28, as "*Eriocauli*, sp. nov?"

Leaves 1 to 3 inches long, smooth, about the same length as the sheaths or longer; eight to twelve-nerved, obtuse and callous at the apex. Scapes 4 to 15 inches high, smooth, six or seven-sulcate. Roots thick, nodose. Heads very white-woolly, globose, 2 to 3 lines in diameter. Involucral scales smooth, obtuse, somewhat longer than the bracts, straw-colored. Receptacle pilose. Bracts spatulate, fuscous, abruptly acute, woolly on the back and coarsely white-bearded on the apical margins. Flowers 1½ line high; perianth six-parted, the three exterior segments free, white below, fuscous above and bearded at the apex. In the staminate flower the interior perianth is stipitate and the two anterior segments are connected with the posterior one; in the pistillate flower they are free. All the segments are bearded at the apex. Stamens six. Ovary stipitate, three-celled; style three-parted. The species is well distinguished from *E. decangulare*, to which it is similar in habit, by its six-parted flowers. Hartweg collected this plant at Lagos, Mexico.

Wet grounds, Province of Jalisco, Mexico, Palmer, 1886, No. 44, and Pringle, 1888, No. 1,734. June–November.

9. ERIOCAULON PRINGLEI, S. Wats.

E. Pringlei, S. Watson, Proc. Am. Ac. xxiii. 283 (1888).

A delicate plant with slender five to six-sulcate scapes ½ to 5 inches high, all the parts very smooth. Leaves acuminate, flat, about three-nerved, as long as or a little longer than the sheaths. Roots finely fibrous, spongy. Heads 1 to 1½ lines in diameter, fuscous. Involucral scales obovate, scarious, very dark, eroded at the apex. Receptacle smooth. Bracts pointed. Flowers scarcely ½ line high. Exterior perianth segments in both kinds of flowers two; the interior three. Sterile flower—outer segments free, pointed, entire; inner with a short tube or stipitate, eroded or denticulate at the apex. Stamens six. Fertile flower—outer segments the same; inner very narrow, shortly tubular at base. Ovary three or sometimes two-celled. Style three or sometimes two-parted.

Wet places at the base of Sierra Madre, Chihuahua, Mexico. Pringle, No. 2,018. October.

2. DUPATYA, Vell. Fl. Flum. 35, No. 42 (1825).

Pæpalanthus, Mart. Nov. Act. Nat. Cur. xvii. 1, 13 (1833-5).

This genus closely resembles *Eriocaulon* in general appearance and habit, but is distinguished by having the interior segments of the sterile flower campanulate-tubular, and the stamens of the same number as the lobes. The flowers are with rare exceptions three-parted throughout, the three stigmas often bifid. Seeds oval, more or less costate.

The genus is very extensively represented in South America, being concentrated in Brazil. Körnicke in his monograph enumerates 215 species. Only one is found in North America.

1. DUPATYA FLAVIDULA (Mx.).

Eriocaulon flavidulum, Mx. Fl. ii. 166 (1803).

Pæpalanthus flavidulus, Kunth, Enum. iii. 532 (1841).

Dupatya flavidula, Kuntze, Rev. Gen. Pl. 745 (1891).

Leaves 1 to 2 inches long, three to five-nerved, linear-subulate, floccose at base and smooth or sparingly pubescent above. Scapes numerous, five-sulcate, pubescent, 4 to 12 inches high. Sheaths longer than the leaves, obliquely fissured, slightly inflated at the summit, pubescent like the scape. Heads 2 to 3 lines in diameter. Involucral scales straw colored, scarious, smooth, shining, oval or ovate, obtuse, somewhat hairy at base. Receptacle pilose. Bracts very thin, white, linear, rounded or pointed at the apex, about as long as the flowers, slightly hairy, often obsolete. Flowers about 1¼ line high, trimerous, long pedicellate. Sterile flowers—outer perianth segments woolly at base, obovate or truncate and pilose at the apex. This encloses the inner part of the perianth consisting of a smooth, delicate, white; campanulate, somewhat three-toothed tube; stamens three, slightly exserted. Fertile flowers—outer perianth segments distinct, hairy at base, linear, acute, smooth, white, upper similar but much narrower, enclosing the ovary and connate over it nearly to the top. Style three-parted, forming three stigmas. Seeds sparingly and obscurely costate when mature. Roots spongy, scarcely nodose.

Körnicke (Linnæa, 27, 590) under the name *Eriocaulon flavidulum*, Mx., following Pursh (Fl. 1, 92) and Elliott (Bot. ii 566) states that two plants have been sent from North America under this name and that he regards Kunth's *P. flavidulus* as something distinct from the plant of Michaux. That which he describes is undoubtedly something distinct and is clearly an *Eriocaulon*, but, so far as I can judge, it corresponds very nearly, if not quite, to *E. articulatum*. The plant of Elliott is also, I think, that species. Michaux distinctly calls his species *puberulent* and the scapes *aggregated* and five-striate, while his other characters correspond very well with our plant. There is not, so far as ascertained, any other in the habitat given by him, " Carolina " that bears such characters.

Low sandy pine barrens, So. Va. to Florida. March–July.

3. LACHNOCAULON, Kunth, Enum. iii. 497 (1841).

Very similar to *Eriocaulon* in general appearance and habit, but distinguished by having the outer perianth only, the flowers always three-parted, three stamens which coalesce in a tube beneath, and one-celled anthers. The staminal tube appears to take the place of the sterile outer perianth segments of *Eriocaulon* and *Pæpalanthus*, and the place of the inner segment of the fertile flower is occupied in this genus by a loose mass of hairs, or sometimes by three rows of hairs. Style club-shaped, dividing into three bifid stigmas which alternate with three appendices.

The genus is confined to the Southern United States, in which four species occur.

1. LACHNOCAULON ANCEPS (Walt)

Eriocaulon anceps, Walt. Fl. Car. 83 (1788).

E. villosum, Mx. Fl. ii. 166, (1803) Pursh, Fl. i. 92, (1814).

L. Michauxii, Kunth, Enum. iii. 497, (1841) Chap. Fl. 504, (1860).

Leaves 1 to 3 inches long, tapering to an obtuse callous point, smooth or sparingly hairy, seven to twelve-nerved or often apparently nerveless. Scapes slender, 2 to 20 inches high, two to four-ribbed, the ribs themselves often with intermediate striæ, clothed with long, soft, appessed, upwardly-pointed hairs. Sheaths as long as or shorter than the leaves, hairy like the scape, and pointed like the leaves. Heads globose, 1 to 3 inches in diameter. Involucral scales ovate or oblong, obtuse or pointed, smooth or hairy, shorter than the flowers, usually fuliginous. Flowers about 1 line high, bracts fuliginous, spatulate, often keeled, surrounded at base by the yellowish, silky hairs of the villose receptacle and white bearded at the apex. Perianth segments in the sterile flower on a short stipe which is hairy at the base, spatulate, fuliginous and fimbriate at the apex. Those of the fertile flower white, smooth, oblong, obtuse; ovary sessile, densely villous around the base; style three-divided; stigmas bifid, seeds strongly costate. Roots finely fibrous. The white segments of the fertile perianth mingled with the fuliginous woolly segments of the sterile flowers impart a mixed gray and dark appearance to the heads.

Low pine barrens, So. Va. to Florida. March–June.

2. LACHNOCAULON GLABRUM, Körn.

L. glabrum, Körn. Linnæa, xxvii. 568, (1854), Chap. Fl. 504, (1860).

Leaves ½ to ¾ inch long, flat, acuminate, blunt and callous at the tips, about as long as the sheaths, smooth or with a few scattered hairs at the margins. Scapes numerous, smooth, 3 to 4 inches high, and three to five-angled. Heads very dark and nearly smooth externally, at first globose, becoming cylindrical or slightly conical and 3 lines long, looking, as Chapman observes, not unlike those of *Eleocharis ovata*. Involucral scales fuscous, lighter in color than the bracts and flowers, ovate, acute, smooth or pubescent. Receptacle villous with clavate hairs. Bracts very dark, pubescent, carinate on the back and cucullate at the apex, enclosing the flowers. Flowers scarcely ½ inch high, much smaller than those of No. 1. Segments woolly at base, the anterior much like the bract and partially enclosing the others. The peculiar dark, matted, and smoothish appearance of the heads in this species is owing to the cucullate bracts and flowers which are closely packed together.

Roots finely fibrous, not nodose. Ovary three-celled, styles divided into three stigmas. Körnicke makes the stigmas bifid, but in all the specimens that I have examined they are entire. Seeds strongly costate.

Sandy shores of the Gulf of Mexico, Florida. (Chapman). Oct.

3. LACHNOCAULON BEYRICHIANUM, Sperdeler.

L. Beyrichianum, Sperdeler in Körn. Linnæa, xxvii. 567, (1854).

Leaves bright green, 1 to 1½ inch long, tapering to a sharp point, obscurely nerved, often woolly at base, scantily hairy above, somewhat longer than the sheaths. Scapes numerous, 1 to 3 inches high, three to five-striate, sparsely hairy, the hairs like those of No. 1. Heads globose or cylindrical and slightly longer than broad, 1 to 1½ lines long, grayish-villose, the hairs very apparent. Involucral scales oblong, obtuse, hairy or becoming glabrate, fuscous. Bracts spatulate, somewhat larger than the flowers, smooth or grayish pubescent above. Segments of perianth much the same. Flowers scarcely half a line high. Receptacle hairy as in No. 2. Styles divided into three simple stigmas.

Körnicke attributes this species to Ebenezer, a place in middle Georgia, collected there in July by Beyrich. It was distributed as *L. glabrum* by Curtiss, No. 3,022, collected by him on "Sandy shores, Walton County, N. W. Florida." September.

Bentham and Hooker (Gen. Pl. iii. part 2, p. 1,024) regard Körnicke's plants as well developed specimens of *L. anceps*, but the species is quite distinct both from *L. anceps* and *L. glabrum*. From the former it is distinguished by its much smaller size, numerous scapes, smaller and more elongated heads, obtuse involucral scales, far smaller flowers and simple stigmas; from the latter by its hairy scapes, grayish-villose, nearly globose and far smaller heads.

4. LACHNOCAULON DIGYNUM, Körn.

L. digynum, Körn. Linnæa, xxvii. 570, (1854).

I have not seen specimens of this. Körnicke attributes it to Alabama, from whence it was sent by Bentham, and describes it as having a leafy epigean stem ½ to 1½ inch in length. Leaves smooth, nervose-striate, flat, bright green, 4 to 7 lines long. Scapes smooth, 3 to 5 inches high. Sheaths obliquely fissured, sparsely pilose, a little longer than the leaves. Heads semi-globose, 1 line in diameter, grayish-villose. Involucral scales oblong, acute, ciliate at the apex and villous on the back, at length glabrescent, fuscous. Bracts spatulate, carinate. Receptacle pilose. Flowers pedicellate; segments of the perianth connate toward the base, spatulate, rounded and hairy at the apex. Stamens three, anthers oblong, white; the triple segments of the rudimentary pistil in the sterile flower papillose. Fertile flowers sessile, segments of the perianth free, obovate, narrowed at the base, pilose at the top of the back. It differs, according to Körnicke, from all the preceding species in having a two-celled ovary, two appendices, a two-parted style and bifid stigmas.

It is regarded by Benth. and Hook. l. c. as probably a depauperate form of *L. anceps*, with heads not yet well developed, but it appears to me to come much nearer to *L. Beyrichianum*. Fresh specimens are very desirable.

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 22.

New or Noteworthy North American Phanerogams.—V.

BY N. L. BRITTON.

(Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, VOL. XVIII, NO. 12, Dec. 1891.)

New or Noteworthy North American Phanerograms.—V.

By N. L. Britton.

Thalictrum dioicum, L. var. CORIACEUM n. var. Segments of the decompound leaves firm, pale beneath, rather dark green above, reniform-orbicular and broader than long, or obovate, deeply and sharply incised, the lobes rounded. "Plant always diœcious, staminate flowers white, pistillate purple."

At elevations above 3,000 feet, on Blowing Rock, Table Rock and Stone Mountain, North Carolina. Collected by J. K. Small and A. A. Heller, 1891, and by Professor Porter in the same region many years before.

Ranunculus delphinifolius, Torr. in Eaton, Man. Ed. 2, 395 (1818) and subsequent editions; not H.B.K. Nov. Gen. v. 48 (1821).

R. multifidus, Pursh, Fl. Am. Sept. 736 (1814) not Forskall (1775).

R. fluviatilis, Bigel. Fl. Bost. 139 (1814) not of Willd.

R. Purshii, Hook. Fl. Bor. Am. i. 15 (1830) in part.

R. lacustris, Beck & Tracy, in Eaton, Man. Ed. 3, 395 (1822).

The name of this plant has had a very curious history, which I am now prepared to trace, having seen authentic specimens of all the above-cited descriptions. First characterized by Pursh, who gave it a name already belonging to an Egyptian or Arabian plant, it was next alluded to by Dr. Torrey, under the name *R. delphinifolius*. Pursh's type was collected by Bradbury in "Upper Louisiana," and is preserved in the Herbarium of the Academy of Natural Sciences of Philadelphia. Torrey's plant was from New York, and a specimen bearing the label in his own handwriting is contained in the Kew Herbarium, "*R. delphinifolius*, Torr. in Eat. Man. Ed. 2." In his catalogue of plants within thirty miles of New York (1819), Torrey adopted Bigelow's name *R. fluviatilis* for the species; in his Compendium he took *R. multifidus*, and in the Flora of North America and Flora of New York he called it *R. Purshii*, never returning to his original name for it. I have been unable to ascertain his reason for this course. Perhaps, he thought this was preoccupied by the homonym of Humboldt, Bonpland and Kunth, which was published, however, three years later.

In his discussion of this plant in Pittonia, ii. 62, Professor Greene adopts the name of Beck and Tracy and I have followed him in alluding to it, but the Kew specimen from Dr. Torrey and a glance at the second edition of Eaton's Manual are conclusive proof that we have been wrong.

The arctic and Rocky Mountain plant, *R. Purshii*, Richards, Frank. Journ, 741 (1823); *R limosus*, Nutt., *R. multifidus*, var. *repens*, S. Wats., appears to me to be specifically distinct. It is a creeping, pubescent, uliginous species with smaller flowers and smaller achenes which have an acutish back, and the style is slender; *R. delphinifolius* is normally strictly aquatic, glabrous, its achenes have a thickened, almost winged margin, and the style is flat and broadened at the base. It develops broader leaf-segments when the water in which it habitually grows becomes low and the plants thus become emersed.

It should be added that a specimen from Dr. Torrey, labelled *R. lacustris*, Beck and Tracy, is preserved in the Philadelphia Herbarium, and is the same species as *R. multifidus*, Pursh, which may be further proven by the figure of *R. lacustris* published by Beck and Tracy in Trans. Albany Inst. i. plate V. I have not access to a copy of the first edition of Eaton's Manual.

Ranunculus trichophyllus, Chaix, in Vill. Hist. Pl. Dauph. i. 335 (1786).

R. aquatilis, var. *trichophyllus*, A. Gray, Man. Ed. 5, 40 (1867).

I think this should rank as a species rather than a variety of *R. aquatilis*, L., which only exists in America, as far as known, in the far northwest, where it is represented by the var. *heterophyllus*, as pointed out by Dr. Gray.

Hypericum mutilum, L. Sp. Pl. 787 (1753).

Ascyrum Crux-Andreæ, L. loc. cit.

While it may, perhaps, be ascribed to a blunder in the make-up of the first edition of the "Species Plantarum," there is no doubt whatever that Linnæus described the same plant as two species in different genera on the same page. This has been indicated by Torrey and Gray, (Fl. N. A. i. 672). The specimen described by Plukenet (Mant. 104), as "Hypericoides ex terra Mariana floribus exiguis luteus" on which Linnæus based his *A. Crux-Andreæ*, is preserved in the Sloane Herbarium, (vol. 92, p. 85), at the British Museum of Natural History, and is *Hypericum mutilum*, while the specimens of Gronovius, on which he based *H. mutilum*, are in the general herbarium of the same institution. The plant taken up by Torrey and Gray for *A. Crux-Andreæ* is *A. hypericoides*, L. Sp. Pl. 788, as evidenced by the Gronovian specimen on which it is based, fortunately also preserved.

President Coulter, in his paper on the North American Hypericaceæ (Bot. Gaz., 1886, 80), has maintained that we have two closely related species of *Ascyrum*, associating specimens from the southern states with the tropical American plant which Linnæus took up for his *A. hypericoides* in the second edition of his Species Plantarum (p. 1108), basing it on specimens sent him by P. Browne from Jamaica, one of which is preserved in his herbarium. However, whether we have one species or two, the northern plant is the original *A. hypericoides*, and should bear that name. All the specimens in the Columbia College Herbarium, including many from Florida, are readily referable to it, and different from the West Indian and Central American species.

Hypericum Canadense, L., var. *minimum*, Choisy in DC. Prodr. i. 550.

The type of this is preserved in the "Prodromus Herbarium" at Geneva. It is a fragment of a three-styled species with narrow leaves, not satisfactorily referable to *H. Canadense*, though it may as well be that as anything else, and its origin is unknown. From Choisy's remarks at the place of publication, he apparently thought it was Mexican. In any event it is not at all the Northern plant with oval or orbicular lower leaves which has been refered to it, and which may be called *H. Canadense*, var. BOREALE.

Potentilla Canadensis, L. Sp. Pl. 498 (1753).

Potentilla simplex, Michx. Fl. Bor. Am. i. 303 (1803).

P. Canadense, var. *simplex*, T. and G. Fl. N. A. i. 443 (1840).

From the very great difference in appearance of the extreme forms of this plant, I had about come to the conclusion that *P. simplex*, the large, ascending or erect condition, was actually specifically distinct from the smaller one with prostrate branches. But a study of the plant during the past spring in the vicinity of New York has convinced me that *simplex* cannot be separated even as a variety, for I found them growing from the same clump. In shaded woodlands the *simplex* condition prevails, while the other prefers open places, and reaches its extreme degree of depression (var. *pumilio*, T. and G.) in very dry, sterile soil. There is, therefore, no more reason for maintaining varieties in it than in the case of *Erigeron Canadense*, which varies from an inch in height to ten feet or more. The type of *P. Canadense*, L is preserved in the Linnæan Herbarium, and that of *P. simplex*, Michx. in the herbarium of Michaux at Paris, and so far as they go, are correctly understood.

RUBUS MILLSPAUGHI, n. sp.

Ascending, wand-like, entirely unarmed or with a very few, weak prickles above, glabrous throughout or the younger shoots scurfy-pubescent. Stems 1½-4 meters long; leaves long-petioled, pedately five-foliolate or some of those on the twigs three-foliolate; leaflets thin, oval, glabrous on both sides, long-acuminate at the apex, mostly rounded at the base, 12-15 cm. long, about 5 cm. wide, sharply but not deeply serrate; stalk of the terminal leaflet 7-10 cm. long; inflorescence loosely racemose; bracts linear-lanceolate; pedicels slender, ascending; sepals lanceolate, acuminate; fruit black, about 10 mm. long.

In rich woods, Point Mt., West Virginia, at 3,500 ft. altitude (C. F. Millspaugh). Nearest to *R. villosus*, but evidently a distinct species. Curiously enough there is a leaf of this plant glued down on the sheet of *R. Canadensis*, L. in Herb. Linn., and it appears to have been included in his description of that species—the specimens furnished by Kalm.

Agrimonia striata, Michx. Fl. Bor. Am. i. 287 (1803).

A. Eupatoria of most American authors, not of L.

A. Eupatoria, var. *parviflora*, Hook. i. 196 (1832).

The American plant has certainly been erroneously referred to the European *A. Eupatoria*, which is very distinct from it, by its larger flowers and fruit, denser inflorescence, much greater amount of pubescence and different foliage. The genus *Agrimonia* was monographed by Wallroth in his "Beiträge zur Botanik," i. 1-61 (1842), and a much larger number of species recognized than have since been admitted. There is at least one of his North American species there first described, which seems to me perfectly good ; this is :

Agrimonia microcarpa, Wallr. Beitr. i. 33, 39, t. 1. f. 3. (1842).

Smaller and more slender than *A. striata,* villous-pubescent at least below. Larger leaflets 3-5, obovate, obtuse or sometimes acutish at the apex, narrowed or cuneate at the base, dentate, 1½-5 cm. long, glabrous or nearly so above, generally pubescent along the veins beneath ; raceme very slender, the flowers short-pedicelled, less than two lines broad ; petals slightly exceeding the calyx-lobes ; fruit smaller, about 3 mm. long.

In dry soil, Pennsylvania (according to Wallroth), Maryland (Rusby), to Florida (Chapman), west to Kentucky (Short) and Louisiana (Carpenter).

MAMILLARIA NOTESTEINII, n. sp.

Stems oval, simple or cæspitose, about 3 cm. in diameter. Tubercles nearly terete and about 6 mm. high ; spines 12-18, white, becoming gray with age, weak and slender; 8-12 mm. long, spreading, pubescent throughout. Usually each tubercle bears a central spine which is longer and stouter than the others, and is frequently tipped with pink ; flowers 15-25 mm. in diameter, ash-gray, tinged and penciled with a delicate pink. Petals broadly linear-oblong, mucronate tipped ; fruit obovoid ; seeds black, globose, pitted.

Found in gravelly soil, near a small creek, in the vicinity of Deer Lodge, Montana, by Prof. F. N. Notestein, June 4th, 1891.

OXYPOLIS, Raf. Neogen. 2 (1825).
Tiedemannia, DC. Mem. Omb. 51, t. 12 (1829).
Archemora, DC. loc. cit. 52 (1829).

Rafinesque characterizes the genus and cites *Sium rigidius,* L. as the type, so there can be no question about what he had in mind. This plant is well known to be *Archemora rigida,* DC., and *Tiedemannia rigida,* Coult. and Rose.

PTILIMINUM, Raf. Neogen. 2 (1825).
Discopleura, DC., Mem. Omb. 38 (1829).

Rafinesque also characterizes this genus and gives *Ammi capillaceum*, Michx., as the type. This is *Discopleura capillacea*, DC.

SPERMOLEPIS, Raf. Neogen. 2 (1825), not Brong. & Gris.

Leptocaulis, DC. Mem. Omb. (1829).

This genus is based on *Daucus divaricatus*, Walt., which is *Sison pusillum*, Michx., *Leptocaulis divaricatus*, DC., and *Apium divaricatum*, Wood. If this species and its allies are to be kept distinct from *Apium*, L. as has been done by Coulter and Rose, it should be under Rafinesque's generic name.

ADORIUM, Raf. Neogen. 3 (1825).

Marathrum, Raf. Journ. Phys. lxxxix. 101 (1819), not Humb. and Bonpl.

Musenium, Nutt. in T. and G. Fl. N. A., i. 642 (1840).

Perceiving that the generic name *Marathrum* was already used, Rafinesque substituted for it *Adorium*, eleven years before Nuttall named *Musenium*. The names of Rafinesque and Nuttall are both based on *Seseli divaricatum*, Pursh.

Solidago juncea, Ait. var. RAMOSA, Porter and Britton, n. var.

Differs from the typical plant in the numerous, strict, erect branches, the racemes numerous, slender, erect or slightly recurved at the ends.

In fields, western New Jersey and eastern Pennsylvania (Porter), Ohio (Sullivant), and West Virginia (Millspaugh). Strikingly different in appearance from *S. juncea*. Professor Porter informs me that he sent specimens of the plant to Dr. Gray, after the volume of the Synoptical Flora containing the Compositæ was issued, and was told that he had not seen it before.

Cyperus Houghtoni, Torr. Ann. Lyc. N. Y. iii. 277 (1836).

This species was described by Dr. Torrey from a specimen collected by Dr. D. Houghton at the Lake of the Isles, Northwest Territory, in August, 1831, (No. 73), and the type of it is preserved in the Columbia College Herbarium. He subsequently concluded that it was not distinct from his *C. Schweinitzii*, as is indicated in pencil in his copy of the Monograph of North American Cyperaceæ, and in his copy of Steudel's Cyperaceæ. In his herbarium the types of both species are mounted on the same sheet. I passed the plant over in my Preliminary List of North American Species of Cyperus, (BULLETIN, xiii. 205-216), having only the original specimen to go by, and accepting Dr. Torrey's later view. But recently I have had numerous specimens from the Northwest and other regions, which maintain the characters of the original, and satisfactorily establish the species as a good one.

My attention has been especially called to it by Mr. John M. Holzinger, Assistant Botanist to the U. S. Department of Agriculture, who last year sent me abundant specimens collected by Dr. E. A. Mearns, U. S. A., at Camp Douglas, Wisconsin. I did not then recognize in these Torrey's species, and was disposed to regard the plant as undescribed. Mr. Holzinger has again sent me more and very fine specimens of Dr. Mearns' collection of 1891, and thus by impressing on me the characters of the plant, caused me to make a careful examination of the group to which it belongs.

The species is nearest *C. Schwenitzii*, but readily distinguishable from that plant by its globose, dense heads, smooth culms, shorter and broader truncate or apiculate scales, and shorter nut. I have it now from the following localities: Lake of the Isles, N. W. Terr., (Houghton No. 73); Camp Douglass, Wisc., (Mearns No. 28); St. Croix River, Minn., (Holzinger); Cheboygan Co., Mich., (C. F. Wheeler); Wichita, Kans., (Carleton); Columbia River, Sand Island, Oregon, (Thos. Howell); Kuskuski River, (Wilkes Exp.); Wareham, Mass., (Ex. Herb. L. H. Bailey); Lake George, N. Y., (Wm. H. Leggett). It thus ranges all across the continent. I referred the Oregon specimens collected by Geyer, which I saw in Herb. Gray to this species in my Preliminary List, but was uncertain about them. They probably belong here.

The plant which I described in my Preliminary List (p. 208) as *C. Schweinitzii*, var. *debilis*, which extends from Colorado (Redfield) to Chihuahua, is most likely another distinct species.

Rynchospora scutellata, Griesb. Cat. Pl. Cub. 246 (1866).

This species, founded on Charles Wright's No. 3406 from Western Cuba, was collected by the late Mr. H. W. Ravenel on damp prairies near Indianola, Texas, May 3d, 1869, (No. 160), and distributed under the manuscript name *Ceratoschœnus brevirostris*, n. sp. I am indebted to Mr. C. B. Clarke for the determination. The following description may serve for its identification: Stem erect, rather stout, 3-9 dm. high, glabrous. Leaves linear, flat, the lower 3-4 dm. long, 6-8 mm. wide, slightly roughened on the margins, those of the stem distant, shorter; spikelets lanceolate 6-10 mm. long, three to five-flowered in corymbose clusters, the rays slender, unequal, 2½-5 cm. long; clusters composed of three to five spikelets; glumes brown, ovate, acute, mucronate, the fertile ones larger than the sterile; nut brown, ovate or obovate, compressed, slightly concave on each face, 3-4 mm. long, finely puncticulate, with a rather prominent keel on both edges; beak black, compressed, conic, about as long as the nut, slightly papillose, bristles slender, unequal, the larger equaling or slightly exceeding the nut, finely barbed upwardly.

The Texan specimen differs from the Cuban only in its larger and denser clusters and somewhat narrower nut. The species comes next to *R. corniculata*, (Lam.)

STENOPHYLLUS, Raf. Neogen. 4 (1825).

This proposed genus of Rafinesque is briefly characterized by him and *Scirpus stenophyllus*, Ell. named as the type. This plant is the same as *Dichroma cæspitosa*, Muhl., and was transferred to *Isolepis* by Dr. Torrey in his monograph of the North American Cyperaceæ (Ann. Lyc. N. Y. iii. 353, 1836). In 1837 Kunth (Enum. ii. 209) independently referred it to *Isolepis*, but under a section which he proposed should form a genus under the name *Bulbostylis*, although he did not name the species under that genus. I allude to Rafinesque's genus here because Mr. C. B. Clarke has sent me specimens of the Indian *Isolepis barbata*, a very closely allied species under the name *Bulbostylis barbata*, and informe me that he has adopted Kunth's genus as distinct from *Fimbristylis* and *Scirpus* in his forthcoming monograph of the Cyperaceæ Rafinesque's generic name has twelve years priority over Kunth's. Our *Fimbristylis capillaris* (L.) and a number of tropical American species are congeners. The genus is especially distinguished by the thickened, persistent base of the style, and most of its species have ciliate leaves.

CONTRIBUTIONS FROM THE HERBARIUM OF
COLUMBIA COLLEGE.—No. 23.

THE AMERICAN SPECIES OF THE GENUS ANEMONE AND THE GENERA WHICH HAVE BEEN REFERRED TO IT.

By N. L. BRITTON.

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III.—*The American Species of the Genus Anemone and the Genera which have been referred to it.*

BY N. L. BRITTON.

Read October 12, 1891.

The genus *Anemone* as recognized by Bentham and Hooker in 1862 (Gen. Pl., i, 4), contained on their estimate about 70 species; Durand (Index. Gen. Phanerog. 1 (1888) estimated that the number then known was about 85, while Prantl (in Engler and Prantl, Naturl. Pflanzenfamilien, Lieferung 19, p. 61, 1888), placed the number at 90, including in this estimate the 5 known species of *Knowltonia;* so we may take Durand's estimate as the last one made. It was monographed by Pritzel (Linnæa, xv, 561–698, 1841). The species are widely distributed in temperate and subarctic or alpine regions of both hemispheres. A few occur in warm temperate and tropical regions, but the group is essentially one of temperate climates; 13 occur in Europe, 15 in British India, especially in the Himalayas (Hooker, Fl. Brit. Ind., i, 7), 16 in China (Forbes and Hemsley, Journ. Linn. Soc., xxiii, 10), 2 in South Africa (Harvey and Sonder, Fl. Cap., i, 3), 1 in Australia (Bentham, Fl. Austral., i, 8). In the following pages 39 species are recognized as American, placed in six genera, all of which are kept in *Anemone* by Bentham and Hooker, Baillon, and Engler and Prantl.

There has been no agreement among authors as to the limits of the genus. Tournefort recognized *Anemone* and *Pulsatilla.* Linnæus in the earlier editions of his Genera Plantarum had *Hepatica, Pulsatilla,* and *Anemone,* but united them all in the first edition of his Species Plantarum. Adanson maintained *Anemone* and *Pulsatilla.* Jussiæu united all three. Among more recent authors there has been equal difference of opinion. Ledebour (Fl. Ross., i, 13–23) maintained the three as distinct, and this view is accepted by Nyman (Consp. Fl. Europ., 2–4). Gray has recognized *Anemone, Pulsatilla* and *Hepatica* in the first four editions of his Manual and in his Genera Illustrata, but united *Pulsatilla* with *Anemone* in the fifth edition. Watson reduced them to *Anemone* in his Bibliographical Index, but in the sixth edition of Gray's Manual retains *Hepatica* as a genus. Freyn, who has recently studied Ranunculaceæ, considers *Pulsatilla* distinct (Deutsche Bot. Monats., viii, 78, 1890).

I am satisfied after a study of nearly all the described species that the first treatment of the group by Linnæus is the most satisfactory. There is perhaps less reason for keeping *Anemone* and *Pulsatilla* distinct than for separating *Hepatica*, but I find no transitions from *Pulsatilla* to *Anemone*, and it forms a very natural group of species both as to structure, habit, and geographical distribution throughout the north temperate zone.

As to the other genera referred to *Anemone* by recent authors I think them also clearly distinct. *Syndesmon*, Hoffm. (*Anemonella*, Spach), of eastern North America, has no close analogue in either *Thalictrum* or *Anemone*, to both of which it has been referred, and I entirely agree with Dr. Watson in keeping it as a genus, although under the older of the two generic names. *Barneoudia*, Gay, species of extra-tropical South America, are to me very different from any true *Anemone* or *Hepatica*, and very circumscribed in distribution. *Knowltonia*, of South Africa, referred to *Anemone* by Baillon and Engler and Prantl, but kept up by Bentham and Hooker, I regard as distinct for similar reasons.

The essential characters of the genera known to occur in America as understood by me may be indicated as follows:—

Achenia with long, plumose, persistent styles; outer stamens often sterile; involucre remote from the flower, 3-leaved; radical leaves digitately much divided...1. **Pulsatilla.**

Achenia glabrous, pubescent, or woolly, with short, subulate, not plumose styles; stamens all antheriferous; involucre remote from the flower or flowers, 1–3-leaved, the leaves sessile or petioled; radical leaves various. 2. **Anemone.**

Achenia pubescent, short-beaked; stamens all antheriferous; involucre approximate to the flower, 3-leaved, calyciform, the leaves sessile; radical leaves petioled, 3-lobed or sometimes 5–7-lobed...... ......3. **Hepatica.**

Achenia? carpels densely villous-pubescent; style glabrous; filaments all antheriferous; involucre 0; leaves petioled, entire........4. **Capethia.**

Achenia cylindric; style filiform; stigma papillose; outer stamens dilated and petaloid; involucre 5–6-leaved or 5–6-lobed, contiguous with the flower; radical leaves entire, lobed or bifid........................5. **Barneoudia.**

Achenia columnar, terete, deeply grooved, the stigma sessile and truncate; stamens all antheriferous; involucre distant from the flower, of 2–3, sessile, ternate, long-stalked leaflets; radical leaves 2–3-ternately compound...6. **Syndesmon.**

1. PULSATILLA, L. Gen. Pl., 163 (1737).

1. **Pulsatilla hirsutissima** (Pursh).

Clematis hirsutissima, Pursh, Fl. Am. Sept., 385 (1814).
Anemone Ludoviciana, Nutt. Gen., ii, 20 (1818).
A. Nuttalliana, D.C. Syst., i, 193 (1818).
A. Nuttallii, Nutt., Journ. Acad. Phil., 1825, 158.
Pulsatilla Nuttalliana, Spreng. Syst., ii, 663 (1825).
A. patens, Hook., Fl. Bor. Am., i, 4 (1830), not L.
Pulsatilla patens, A. Gray, Gen. Ill., i, 18, t. 3 (1848), not Mill.
A. patens, var. *Nuttalliana*, A. Gray, Man. Ed. 5, 36 (1867).
A. patens, var. *hirsutissima*, Hitch., Trans. St. Louis. Ac., v, 482 (1891).

Villous, 12–40 cm. high. Leaves much divided into narrow, linear, acute lobes, the radical on slender petioles, those of the involucre similar, sessile, erect or ascending; sepals ovate-oblong, 2½–3½ cm. long, bluish-purple; fruit a head of silky achenia, with long, plumose styles. After flowering the peduncle elongates, sometimes to 30–40 cm.

Distrib. Prairies of Illinois to Manitoba, west to the Rocky Mountains, north and northwest. Perhaps also in Siberia.

The plant differs constantly from the European *P. patens* (L.), in its narrower and usually longer leaf-segments, and smaller flowers. The type of *Clematis hirsutissima*, Pursh, is in the Herbarium of the Philadelphia Academy of Natural Sciences.

2. **Pulsatilla occidentalis** (S. Wats.).

Anemone alpina, Hook., Fl. Bor. Am., i, 5 (1830), not L.
Anemone occidentalis, S. Wats., Proc. Amer. Acad., xi, 121 (1876).
Pulsatilla occidentalis, Freyn, Deutsche Bot. Monats., viii, 78 (1890).

Rather stout, silky-villous, 15–50 cm. high, simple. Radical leaves long-petioled, biternate, the divisions deeply pinnatifid into usually incised, linear, acute lobes; leaves of the involucre similar, short-petioled; flower 15–40 mm. broad, peduncled, the peduncle much elongated in fruit; sepals 6 or 7, oval-obtuse, white or purplish at the base; receptacle conic, sometimes 4 cm. long; achenia oblong, somewhat pubescent, the persistent plumose styles reflexed, 2–4 cm. long.

The plant differs from the European *P. alpina*, as noted by Dr. Watson, in its more finely dissected leaves with narrower segments, and in its elongated receptacle. I have not seen true *alpina* from America.

Distrib. California: Mt. Shasta (Brewer, 1419); Lassen's Peak, Sierra Nevada (Lemmon, 954). Oregon: Mt. Hood (T. Howell). Washington: (Tweedy); Mt. Rainier (Piper). British Columbia:

Rocky Mts. (Drummond); Kicking Horse Lake, Lake Agnes, National Park, Mt. Queest, Kootanie Lake, and Selkirk Mts. (Macoun); Cascade Mts. (Lyell); near Lytton (Dieck, according to Freyn); Goose Creek Mts. (Bowman); Kootanie Pass (Dawson).

Type of *Anemone occidentalis*, S. Wats. in Herb. Gray.

2. ANEMONE, L. Gen. Pl., 163 (1737).

* Achenia woolly-pubescent, numerous, densely capitate.

† Plants slender, usually low, 1–2-flowered.

‡ Stems mostly single from a tuberous root.

o Flowers always solitary.

+ Radical leaves or some of them simply ternate.

1. Anemone decapetala, Ard.

A. decapetala, Ard., Spec. Bot., ii, xxvii, t. 12 (1764).
A. trilobata, Juss., Ann. Mus., iii, 247, t. 21, f. 3 (1804).
A. heterophylla, Nutt. in T. & G. Fl. N. A., i, 12 (1838).
A. Berlandieri, Pritz., Linnæa, 1841, 628.
A. Caroliniana, var. *heterophylla*, T. & G. Fl. N. A., i, 12 (1838).
A. decapetala, var. *heterophylla*, Brit. & Rusby, Trans. N. Y. Ac. Sci., vii, 7 (1887).

Appressed pubescent or glabrate, 10–30 cm. high. Stems single or very rarely two together from a globose or cylindric tuber; radical leaves slender-petioled, ternate, the divisions broad, ovate, oval or obovate, stalked or rarely sessile, thick, crenate or incised-obtuse, 1½–2 cm. long; or some of them divided into linear-oblong segments; leaves of the involucre on short, broad petioles, cleft into linear or oblong-linear lobes; flower blue, 2–3 cm. broad; sepals usually 10–20, linear-oblong, obtuse, glabrous; peduncle much elongated in fruit; head of fruit cylindric, ½–2 cm. long; style subulate, about 1 mm. long.

Distrib. Southern Brazil, Uruguay, the Argentine Republic, Mexico, and the southern United States. Brazil: (Arduino in Herb. Linn.); Minas-Geraes (Regnell); Rio Grande do Sul (St Hilaire). Uruguay: Montevideo (Courbon, 119). Argentine: La Plata (Commerson); Buenos Ayres (Tweedie). Mexico: Chihuahua (Torrey fide Hemsley). United States: Arkansas (Nuttall); Texas (Berlandier, 193, 1453, 1891; Reverchon, 4; Wright; Miss Croft; Merrill); American Plains (Hall and Harbour, 6; Buckley; Trecul, 1493); Louisiana (Hale); Alabama (Buckley).

The species shares with a considerable number of other plants the peculiarity of inhabiting the southern United States and Mexico, and extra-tropical eastern South America.

Type of *A. decapetala*, Ard., in Herb. Linn.; type of *A. trilobata*, Juss., in Herb. Mus. Paris; type of *A. heterophylla*, Nutt., in Herb. Col. Coll.; type of *A. Berlandieri*, Pritz. in Herb. Delessert.

++ Radical leaves repeatedly ternately divided.

+ South American.

2. Anemone tri~~dent~~ternata, Vahl.

A. tri~~dent~~ternata, Vahl, Symb., iii, 74, t. 65 (1794).
A. fumariæfolia, Juss., Ann. Mus., iii, 247, t. 20, f. 2 (1804).

Erect, slender, more or less appressed-pubescent, 6–45 cm. high. Radical leaves slender-petioled, repeatedly divided into oblong or linear, acute, dentate or entire segments; leaves of the involucre sessile, similarly divided into narrowly linear or filiform segments; flower solitary, white (?), 12–25 mm. broad; sepals 5–16, linear-oblong, obtuse or obtusish; head of fruit 16–25 mm. long; style short.

Distrib. Southern Brazil, Uruguay, the Argentine Republic, and eastern Chili and Bolivia. Brazil: (St. Hilaire; Sellow, 1161). Uruguay: Montevideo (Commerson; Courbon, 120; Fox, 366; Gibert, 141; Lorentz, 1052; Gillies; King). Argentine: (Hieronymus, 162). Chili: (Lechler, 2798); Nuble (Philippi). Bolivia: Tomina (Weddell); La Banca (Pearce); Sorata (Mandon, 868); La Paz (Rusby, 1753).

Closely related to *A. decapetala*, differing in its finely divided radical leaves, which are often of the aspect of those of some *Thalictrums*.

I have not seen Vahl's specimen, but his figure and description are entirely satisfactory. The type of *A. fumariæfolia*, Juss., is in the Herbarium of the Musée d'Histoire Naturelle at Paris.

+ + North American.

3. Anemone Caroliniana, Walt.

A. Caroliniana, Walt., Fl. Car., 157 (1788).
A. tenella, Pursh, Fl. Am. Sept., ii, 387 (1814).
Hartiana, Raf. Neogen. 2 (1825).

Appressed-pubescent or glabrate, slender, erect, 10–25 cm. high, from a globose or slightly elongated tuber. Radical leaves petioled, ternate, the divisions short-stalked or sessile, cleft or pinnatified into linear or oblong, sometimes cuneate lobes and segments; leaves of the involucre similarly divided on short, broad petioles or sessile; flowers purple or nearly white, 1.5–3 cm. broad; sepals 10–20, linear-oblong, obtuse, more or less pubescent on the exterior; head of fruit ovoid, 1½–2 cm. long; style subulate, usually less than 1 mm. long.

Distrib. Illinois to Nebraska, south to Georgia, Alabama, Louisiana, and Texas.

This has been referred by nearly all recent American authors, myself included, to *A. decapetala*, but erroneously.

The type does not exist in Walter's Herbarium at the British Museum of Natural History, but his description is satisfactory.

oo Flowers usually 2, the second peduncle involucellate.

4. **Anemone sphenophylla,** Poepp.

A. sphenophylla, Poepp., Fragm. Syn., 27 (1833).
A. bicolor, Poepp. in Herb. Distr., No. 150.
A. Chilensis, Spreng. ex Eichl., Fl. Bras., xiii (I), 152 (name only).
A. macrorhiza, Domb. ex Eichl., loc. cit. (name only).
A. bilobata, Phil., Cat. Pl. Vasc. Chil., 5 (?), (name only).

Erect, more or less pubescent, 10–60 cm. Radical leaves slender-petioled ternately divided, the divisions obovate, obtuse, cuneate at the base, variously lobed and cleft; leaves of the involucre short-petioled or sessile by a narrowed base, palmatified into linear or oblong acute segments; flowers commonly 2 (1–3), blue, the first peduncle naked, the subsequent ones involucellate; sepals oblong-oval obtuse, 1–1.5 cm. long, pubescent on the outer side; head of fruit ovoid or cylindric, 2–4 cm. long; achenia densely woolly; style very short.

Type in Herb. Mus. Hist. Nat. Paris.

The species has usually been referred to *A. decapetala*, but is in my judgment distinct, sharing the peculiarity of so many plants of eastern and western America in being closely related but different.

Distrib. Chili and the southwestern United States. Chili: (Poeppig, 151 (type), 150; Bertero, 801, 46; Gaudichaud, 224; Gay, 30; Dombey; Cuming, 645; Philippi, 254; Bridges, 26; Lechler, 3295); Juan Fernandez (Reed). United States: Utah (M. E. Jones, 1607; Johnson; Parry, 1); New Mexico (Wright, 1304; Fendler, Mexican Boundary Survey, 8; near Silver City (Greene); Arizona: Sierra Tucson (Pringle); Verde River Mesa (Smart).

All the Chilian plants which have been referred to *A. decapetala* apparently belong to this species. The North American specimens appear to me to be identical with the Chilian.

‡ ‡ Stems single or several from a slender, woody rootstock.
o Radical leaves simply ternate, the divisions cuneate-obovate, crenate or lobed.

5. **Anemone parviflora,** Michx.

A. parviflora, Michx., Fl. Bor.-Am., i, 319 (1803).
A. cuneifolia, Juss., Ann. Mus., iii, 248, t. 21, (1804).
A. trilobata, Pers. Syn., ii, 97 (1807).
A. borealis, Richards., Frank. Journ., Ed. 2, App. 22 (1823).
A. cuneata, Schlecht., Linnæa, 1831, 574.
A. tenella, Banks, ex Pritz., Linnæa, 1841, 632.

Sparingly hairy, 10–30 cm. high, from slender rootstocks. Leaves petioled, three-parted, the broadly wedge-shaped divisions obtusely lobed or crenate, those of the involucre nearly sessile, more deeply and narrowly lobed; flower 2½ cm. or less in diameter; sepals 5–8, oval, very obtuse, white; head of fruit short-oblong or globose, about 1 cm. long; style subulate, 1 mm. long.

Distrib. Anticosti, Labrador, Newfoundland, and Quebec, Lake Superior, Minnesota, Montana, Colorado, British Columbia, and in Arctic America generally to Alaska. Also in eastern Siberia.

Type of *A. parviflora*, Michx., in Herb. Michx.; type of *A. cuneifolia*, Juss., in Herb. Juss.; type of *A. borealis*, Richards., in Herb. Mus. Brit.

o o Radical leaves ternately pinnatified into linear lobes.

6. **Anemone Drummondii,** S. Wats.

A. Drummondii, S. Wats., Bot. Cal., ii, 424 (1880).

Tufted, slender, erect, 12–22 cm. high, pubescent with long, appressed or slightly spreading hairs. Radical leaves slender-petioled, ternate, the divisions pinnatifid into linear, usually short, obtusish lobes and segments; leaves of the involucre similar, short-petioled; flowers 1–2, long-peduncled, when 2 the second peduncle involucellate about at the middle; flowers 1–2 cm. broad; sepals about 5, oval, obtuse, light blue, finely pubescent on the lower side; head of fruit ovoid, about 1 cm. long; achenia woolly-pubescent, 4 mm. long, tipped with a filiform style of nearly their own length.

Closely related to *A. Baldensis*, L., of Europe, differing especially in the long, filiform style.

Distrib. California: Sierra Co. (Lemmon); Lassen's Peak (Mrs. Austin); Scott Mt. (Greene, Lemmon); Castle Peak and Siskiyou Co. (Pringle). Oregon: Mt. Hood (T. Howell; Henderson). British Columbia: Rocky Mts. (Drummond, Richardson); Canmore, Lake Agnes, Kicking Horse Lake, and Mt. Aylmer (Macoun); N. Kootanie Pass (Dawson).

†† Plants tall, 2-several flowered (rarely 1-flowered).

‡ Lateral peduncles involucellate.

o Involucral leaves short petioled; leaf-segments narrow.

7. **Anemone multifida,** Poir.

A. multifida, Poir., Suppl. Lam. Encycl., i, 364 (1810).
A. Hudsoniana, Richards., Frank. Journ., Ed. 2, App. 22 (1823).
A. Commersoniana, D.C. ex Deless., Ic., i, 4, t. 17 (1820).
A. globosa, Nutt. ex Pritz., Linnæa, xv, 673 (1841).
A. lanigera, Gay, Fl. Chil., i, 22 (1845).
A. sanguinea, Pursh. ex Pritz., Linnæa, 1841, 672.
A. narcissiflora, H. & A. Bot. Beechey, 121, not L.

Silky-hairy, 15–45 cm. high, sparingly branched, the latter peduncles involucellate. Radical leaves long-petioled, five-parted, the cuneiform divisions cleft into linear, acute lobes; those of the involucres short-petioled, more or less cuneate, otherwise similar; sepals 5–9, greenish or red (rarely yellow), oblong, forming a flower 12–25 mm. broad; head of fruit globose or oblong, 12–25 mm. long; achenia compressed, densely woolly, tipped with the subulate styles.

Distrib. Anticosti, Hudson's Bay and New Brunswick to northern New England, west to northern Michigan, Minnesota, British Columbia, and Oregon, and in the Rocky Mountains south through Colorado to Arizona (Mearns); also at the sea-level at the Straits of Magellan. Cape Horn (Hahin, 79); Magellan (Guillon, Voyage de l'Astrolabe et de la Zélée); Magellan (Poeppig, 957, 159 in Herb. Distr.; Chili Austral (Gay, *A. lanigera*); Sandy Point (Cunningham, Lechler, 957); Port Famine (King). Pampas de Arquilhua, base of the Andes, 400 ft. (Pearce).

Some of the specimens from the Straits of Magellan are more woolly-pubescent than those from the United States, but otherwise I have detected no differences.

The type of *A. multifida*, Poir, is in Herb. Jussieu at Paris; that of *A. Hudsoniana, Richards.*, in the Herbarium of the British Museum of Natural History; that of *A. lanigera*, Gay, in the general herbarium of the Paris Museum; and that of *A. globosa*, Nutt., in the Herbarium of Columbia College.

Small specimens without rootstocks may be mistaken for *A. Caroliniana*.

o o Involucral leaves slender-petioled; leaf-segments broad.

8. **Anemone Virginiana,** L.

A. Virginiana, L., Sp. Pl., 540 (1753).
A. hirsuta, Mœnch., Meth. Suppl., 105 (1802).
Abelemis petiolaris, Raf. in Herb. Paris.

Hairy, 60–90 cm. high, stout, branching at the primary involucre, the lateral peduncles bearing secondary involucres. Radical leaves long-petioled, broader than long, three parted, the divisions broadly cuneate-oblong, variously cleft and divided into acute, serrate lobes; leaves of both primary and secondary involucres similar, on petioles 25–50 mm. long; sepals generally 5 [4–5], white or greenish, acute or obtuse; flower 20–40 mm. broad; head of fruit oblong, 20–30 mm. long; achenia compressed, woolly tipped with the persistent subulate styles, which are about 1½ mm. long.

Distrib. New Brunswick and Nova Scotia to South Carolina, west to Kansas and Manitoba and the Canadian Rocky Mountains (Lyell, Macoun).

Type of *A. Virginiana*, L., in Herb. Linn.

In the British Museum Herbarium are two sheets, one from the Chelsea Garden, 1722, the other from Kew, differing from typical *Virginiana* by longer petioles to the involucral leaves, and narrow leaf-segments. There is also a specimen of the same in the Herbarium of Columbia College, received from Meisner, grown in some European garden. I have not seen wild specimens which would exactly match these.

‡ ‡ Lateral peduncles usually naked; involucral leaves slender-petioled.

9. **Anemone cylindrica,** A. Gray.

A. cylindrica, A. Gray, Ann. Lyc. N. Y., iii, 221 (1836).

Silky-hairy throughout, 30–70 cm. high, branched at the involucre. Radical leaves tufted, long-petioled, broader than long, 3–5 parted, the divisions cuneate-obovate or cuneate-oblanceolate, narrow; those of the involucre similar, on petioles about 2½ cm. long; sepals 5–6, greenish-white, oblong, generally obtuse; flowers about 2 cm. broad, on elongated, generally naked petioles; head of fruit cylindrical, 2½–3 cm. or more in length; achenia compressed, woolly, tipped with the minute styles.

Distrib. New Brunswick, eastern New England, Ontario, New York, and northern New Jersey to Kansas and Manitoba; also in the Black Hills and Rocky Mountains south to Colorado, and New Mexico and in British Columbia (Macoun). Plants with secondary involucres found in British Columbia (Macoun), at Presque Isle, Penn. (Garber), and at Lincoln, Neb. (Webber).

Type in Herbarium of Columbia College.

* * Apparently intermediate between divisions * and * * *; achenia numerous, densely capitate, but in the young state only slightly pubescent.

10. **Anemone Tetonensis,** Porter, n. sp.

A. Baldensis, Hook., Fl. Bor. Am., i, 15 (1830)? not L.

Sparingly pubescent with long whitish hairs, especially at the involucre, erect, from a woody rootstock, 10–15 cm. high. Radical leaves slender-petioled, ternately divided, the divisions cleft into linear-oblong, obtusish lobes; leaves of the involucre similar, on petioles about 1 cm. long, their divisions and lobes somewhat broader; flowers 1–2, long-peduncled, 1–1½ cm. broad, red or pink; sepals 5, ovate-oval, obtuse, finely appressed-pubescent without; young achenia in a globose head about 6 mm. in diameter, sparingly pubescent, tipped with short, subulate styles.

Distrib. Idaho: Teton Range, 10,000 feet altitude, 1872 (Coulter); Needle Peak of Lost River Mts., 1890 (Vernon Bailey).

I am uncertain whether the *A. Baldensis*, of Hooker, belongs to this species or to *A. Drummondii*, S. Wats.

* * * Achenia glabrous or merely strigose-pubescent, less numerous.

† Plants strictly 1-flowered.

‡ Involucral leaves sessile or nearly so.

o Achenia with long, reflexed styles.

11. **Anemone Richardsonii,** Hook.

A. Richardsonii, Hook., Fl. Bor. Am., i, 6 (1830).
A. ranunculoides, Richards., Frank. Journ., App. 12, not L.
A. arctica, Fisch., Linnæa, 1831, 574.
A. Vahlii, Hornem., Fl. Dan., t. 2176.

Low, slender, pubescent, 5–30 cm. high, from slender rootstocks. Radical leaves reniform, slender-petioled, 3–5 parted, the lobes acute, broadly oblong, dentate or crenate; those of the involucre similar, sessile; flower single, about 20 mm. broad, white (?); sepals about 6, oblong; head of fruit depressed-spherical; achenia nearly glabrous, compressed, ovate-oblong, reflexed, tipped with a hooked persistent style of about their own length.

Distrib. Greenland, shore of Hudson's Bay, British Columbia, and in Arctic America generally to Alaska; also widely distributed in Siberia.

Type of *A. Richardsonii*, Hook., in Herb. Mus. Brit. and of *A. Vahlii*, Hornem., in Herb. Mus. Paris.

o o Achenia with short styles.

12. **Anemone deltoidea,** Dougl.

A. deltoidea, Dougl. in Hook. Fl. Bor.-Am., i, 6, t. 3, f. a (1830).

Sparingly hirsute-pubescent, simple, slender, erect, 15–30 cm. high. Rootstock filiform. Leaves 3-foliolate, the radical ones slender-petioled, those of the involucre nearly sessile; leaflets ovate, somewhat deltoid, obtuse or rounded at the base, acute at the apex, coarsely and irregularly crenate, sometimes incised, 2–5 cm. long; flower solitary, white, long-peduncled, 15–30 cm. broad; sepals 5–6, oval-obovate, obtuse; achenia several, densely pubescent, ovoid, somewhat flattened; style subulate, less than 1 mm. long; receptacle densely pubescent.

Distrib. Oregon (Scouler; Burke; Nuttall; Howell; E. Hall, 2; Nevius). Washington (Suksdorf); Columbia River (Douglas). California, Humboldt Co. (Rattan; a very large-flowered form with broader involucral leaves).

Type in Herb. Mus. Brit.

‡ ‡ Involucral leaves slender-petioled.
o Eastern species.

13. **Anemone quinquefolia,** L.

A. quinquefolia, L. Sp. Pl., 541 (1753).
A. nemorosa, Amer. Authors, not L.
A. pedata, Raf. Med. Rep. (ii) v, 361 (1808).
A. minima, D.C. Syst., i, 206 (1818).
A. nemorosa and var. *quinquefolia*, A. Gray, Man., Ed. 5, 38 (1867).

Low, simple, nearly glabrous, 10–20 cm. high, from thick, horizontal rootstocks. Radical leaves long-petioled, appearing later than the flowering stem, 3-foliolate, the lateral leaflets 2-parted nearly or quite to the base, the divisions oblong, cuneate, dentate; those of the involucre on slender petioles about 20 mm. long, 3–5 parted, the divisions 3–4 cm. long, acute, variously cut and lobed; flower 18–25 mm. broad; sepals 4–9, obovate or oval, white, or purplish without; head of fruit globose; achenia 4–10, pubescent, oblong, tipped with short, bent styles.

Distrib. Nova Scotia to Georgia, west to the Rocky Mountains; also in China (Herb. Kew).

Readily distinguishable from the European *A. nemorosa* by its slender habit, slender petioles, less lobed divisions of the involucral leaves, paler green of the foliage, and smaller flowers.

The species is based on "Ranunculus nemorum, fragariæ foliis, Virginianus," Pluk., t. 106, f. 3, which is a satisfactory representation of our plant, and on a specimen from Kalm preserved in the Linnæan Herbarium.

14. **Anemone trifolia,** L.

A. trifolia, L. Sp. Pl., 540 (1753).
A. lancifolia, Pursh, Fl. Amer. Sept., 386 (1814)
A. nemorosa, var., A. Gray, Amer. Nat., vii, 422.

Stout, erect, sparingly pubescent, 25–40 cm. high. Radical leaves long-petioled, ternate, the divisions ovate or ovate-lanceolate, acute, coarsely dentate, incised, or the lateral ones sometimes 2-parted, 6–10 cm. long, 4–6 cm. broad, thick; involucral leaves ternate, similar to the radical on stout petioles, 2–4 cm. long; flower white, 20–35 mm. broad; sepals oval, obtuse; head of fruit globose, about 1 cm. in diameter; achenia finely and densely pubescent, numerous, narrowly oblong, acuminate, tipped with short, slightly bent styles.

Distrib. Virginia: Salt Pond Mt. and Peaks of Otter: Pennsylvania; Layton's Station, Fayette Co. (S. W. Knipe, in Herb. Porter). Also in mountainous regions of continental Europe.

Type, a European specimen in Herb. Linn. I have little doubt that Pursh's *A. lancifolia* is this species, but I have not been able to find an authentic specimen of it. He says it occurs "on high mountains in boggy soil, Pennsylvania and Virginia." Schweinitz knew the plant and sent it to A. Brongniart under the name "*A. cuneifolia.*"

oo Western species.

15. **Anemone Grayii,** Behr.

A. Grayii, Behr. in Kellogg, Bull. Cal. Ac., i, 5 (1884).
A. Oregana, A. Gray, Proc. Amer. Acad., xxii, 308 (1887).
A. cyanea, Freyn, Deutsche Bot. Monats., viii, 176 (1890), not Risso, Fl. Nice, 2 (1844).

Stem erect, very slender, nearly glabrous, 20–50 cm. high. Radical leaves slender-petioled, 3-parted, the divisions crenate-serrate; leaves of the involucre on slender petioles 1–3 cm. long, 3-divided, finely appressed-pubescent, the divisions similar to those of the radical ones, but often 2–3-cleft; flower 1½–2½ cm. broad; sepals commonly 5, ovate-oval, obtuse, glabrous, blue or purplish (rarely white?); achenia in a globose head, rather numerous, pubescent; styles short and slightly bent.

Distrib. Washington (Suksdorf). Idaho: Upper Clearwater (Watson, 6). Oregon: (Geyer, 606); Hood River (Mrs. Barrett; Henderson); Cascade Mts. (J. Howell); Waldo (T. Howell, 621);

Clear Water (Spaulding); Mt. Adams (Henderson); Siskiyou Mts. (L. W. Lee). California: (Kellogg and Harford, 4); Sierra Co. (Lemmon, 992); Upper Sacramento River and Mt. Tamalpais (Greene); Redwoods (Bolander; San Geronimo Ranch (Bigelow).

I am regarding the Californian and Oregon species as the same with some hesitation, but the specimens which I have seen do not afford me sufficient characters for their separation, and have followed Professor Greene (Pittonia, i, 48) in reducing *A. Oregana* to *A. Grayii.*

16. **Anemone Lyallii,** n. sp.

Slender, erect, nearly glabrous throughout, 10–40 cm. high, from a short horizontal rootstock. Radical leaves not seen; leaves of the involucre on very slender petioles 1.5–3 cm. long, 3-divided, the divisions sessile, ovate, or the terminal one sometimes nearly orbicular, dentate-crenate, or sometimes incised, acute, or obtuse, very thin, more or less ciliate along the margins; flowers solitary, white, about 1 cm. broad, its peduncle slightly exceeding the petioles of the involucral leaves; sepals about 5, oval-oblong, obtuse; young achenia quite densely strigose-pubescent.

Distrib. Sumass Woods, Lower Frazer River (Lyall); Washington (Suksdorf); Cascade Mts. (Howell); Victoria (Jas. Fletcher); Vancouver Island (Macoun); Wallamette Valley (Cusick); near Portland (Henderson); Salmon River, B C. (Dawson).

Lyall's specimens preserved in Herb. Kew represent two quite different forms of leaves, but they evidently belong to the same species.

† † Plants tall, 2-several-flowered, the lateral peduncles involucellate.

‡ Involucels of the lateral peduncles distant from the main involucre.

o North American.

17. **Anemone Canadensis,** L.

A. Canadensis, L. Syst., Ed. 12, iii, App. 231 (1768).
A. Pennsylvanica, L. Mant., ii, 247 (1771).
A. irregularis, Lam. Encycl., i, 167 (1783), fide S. Watson.
A. aconitifolia, Michx., Fl. Bor. Am., i, 320 (1803).
A. Laxmanni, Steud. Nom., Ed. 2, i, 96.

30–60 cm. high, somewhat hairy, especially on the lower surfaces of the leaves, branching at the involucre. Radical leaves long-petioled, broader than long, 3–5 parted, the divisions broad, oblong, acute, variously cleft and toothed, those of both primary and secondary involucres similar, sessile; sepals white, oblong, obtuse; flower 2½–3½ cm. broad; head of fruit globose; achenia flat, nearly orbicular, pubescent, or nearly glabrous at maturity, tipped with the stout, persistent style which is about their own length.

Distrib. Labrador and Anticosti to Maryland and Pennsylvania, west to Kansas and the Rocky Mountains, and to the Pacific coast of British America (Hooker).

Type of *A. Pennsylvanica*, L., in Herb. Linn.; type of *A. aconitifolia*, Michx. in Herb. Michaux.

At the place of first publication of this plant Linnæus says of its origin: "Hab. in Pennsylvania, D. Hope;" but when he republished it in the Mantissa three years later he says, "Hab. in Canada, H. U. (Hortus Upsaliensis);" curiously interchanging the locality and the specific name.

A. dichotoma, L. Sp. Pl., 540 (1753), of Siberia. (Type in Herb. Linn.), differs constantly in its narrower, oblong, leaf-segments which are toothed only towards the apex, and its glabrous achenia.

oo South American.

+ Leaves coriaceous; flowers 4–5 cm. broad. Chilian.

18. **Anemone rigida,** C. Gay.

A. rigida, C. Gay, Fl. Chil., i, 25 (1845).

Erect, stout, rigid, loosely pubescent, 3–6 dm. high. Radical leaves long-petioled, coriaceous, deeply 3-parted, the divisions obovate, obtuse, incised, and coarsely dentate, the teeth mucronulate; leaves of the involucre sessile or narrowed at the base into short, broad petioles, 3-lobed to beyond the middle, incised and dentate similarly to the radical ones, appressed-pubescent with scattered hairs on both surfaces; involucre about 4-flowered, the first peduncle naked and slightly shorter than the others, which are involucrate with two sessile leaves at about the middle; flowers 4–5 cm. broad; sepals 4–6, broadly oval, obtuse, finely veined; filaments 3–5 mm. long; head of fruit globose-ovoid, about 1 cm. thick; achenia ovoid, acute, glabrous, except for a slight strigose pubescence at the base, tipped with a short, incurved style; receptacle densely pubescent, at length about twice as long as broad.

Distrib. Chili: (Gay); Talcareque (Reed); Cordillera de S. Fernando (Philippi).

Type in the Paris Herbarium.

+ + Leaves membranaceous.

☐ Chilian and Peruvian species.

19. **Anemone Antucensis,** Poepp.

A. Antucensis, Poepp., Fragm. Syn., 27 (1833).

Erect, slender, finely pubescent, 3–7.5 dm. high. Radical leaves slender petioled, membranaceous, deeply 3–5-parted or 3–5-cleft, the divisions obovate or broadly oval, quite regularly incised and coarsely dentate, with obtuse, mucronulate teeth; involucral leaves sessile, otherwise similar to the radical ones; involucre 1–3-flowered, the first peduncle naked, the others involucellate with three or rarely two sessile leaves at about the middle; flowers white, about 2 cm. broad; sepals 4–5, oval, acutish or obtuse; filaments 3–4 mm. long; head of fruit globular; achenia about 15, lanceolate, glabrous, about 5 mm. long, very acute and tipped with a hooked style of about their own length; receptacle scurfy, not pubescent.

Distrib. Chili: Andes de Antuco (Poeppig, 150; Lechler, Pl. Chil., 3059).

Type in the Paris Herbarium.

20. **Anemone helleborifolia,** D.C.

A. helleborifolia, D.C., Syst. i, 211 (1818).
A. æquinoctialis, Poepp., Fragm. Syn., 27 (1833).

Erect, slender, tall, 40–80 cm. high, glabrous or nearly so. Radical leaves long-petioled, rather thick-membranaceous, glabrous, 3-parted, the divisions deeply lobed, cuneate, sometimes parted to the base, acute at the apex, sharply dentate-serrate, 8–12 cm. long; petioles 8–12 cm. long, pubescent or glabrate; leaves of the involucre short-petioled, similar to the radical but smaller, their petioles pubescent; flowers several or numerous, white, 1½–2 cm. broad, the lateral peduncles involucellate near the summit, 1–4-flowered; sepals 5, oval, obtuse; achenia 10–20, oval, glabrous, or very nearly so; style short, hooked; receptacle pubescent.

Distrib. Peru: (Dombey, Poeppig, Pearce.)

Type of both *A. helleborifolia*, D. C., and *A. æquinoctialis*, Poepp., in the Paris Herbarium.

21. **Anemone Peruviana,** n. sp.

Erect, 3–9 dm. high. Radical leaves long-petioled, 5–7-divided, the segments obovate, cuneate at the base, deeply incised and dentate with mucronate-pointed teeth, a few scattered hairs on both surfaces; leaves of the involucre 2–5, short-petioled, mostly 3-divided, otherwise similar to the radical ones, but smaller, their petioles pilose-pubescent at the base; rays of the primary umbel 2–7, slender, 7–15 cm. long, the first one to appear naked and at length shorter than the others, which are involucellate and 2–4-flowered at the summit; flowers nearly an inch broad; sepals 4–7, lanceolate, acute or acuminate, veined; filaments broad; anthers oblong; achenia ovoid, glabrous, 2 mm. long, tipped with a slender, incurved style of about half their length; receptacle pubescent.

Distrib. Peru: Mathews, 537 (Hb. Kew); McLean (Hb. Kew).

☐ ☐ Brazilian species.

22. **Anemone Sellowii,** Pritz.

A. Sellowii, Pritz., Linnæa, xv, 667 (1841).

"Foliis radicalibus ternatis, foliolis breviter petiolatis late ovatis supra argute-serratis, lateralibus profundissime bipartitis, intermedio trifido, involucralibus sessilibus minutis inciso-serratis, caule bifloro, sepalis subnovenis ovato-oblongis, carpidiis glabris, stylo tenui longo apice involuto."

"Habitat in Brasilia, Sellow, Coll. Pl. Bras., 891."

All I know of this plant is drawn from Pritzel's original description, and that of Eichler in Martius Flora Brasiliensis, xiii, part i, 153, t. 34, where the specimen contained in the Berlin Herbarium is beautifully figured. As suggested by Eichler, the species is allied to *A. Antucensis*, Poepp., but the engraving shows that it is clearly distinct.

23. **Anemone Glazioviana,** Urban.

A. Glazioviana, Urban., Linnæa, xliii, 255 (1880–1882).

"Petiolis 15–22 cm. longis, inferne parce, superne sicut lamina magis hirtulo-pilosis, foliis ternatim sectis, foliolis 0.7–3 cm. longe petiolulatis late rhombeis, lateralibus usque ½–⅔ longitudinis 2-partitis, intermedio ad ⅓–½ partem trifido, lobis obovato-rhombeis crenatis crenis apiculatis; pedunculo 1–2 floro, involucro parvulo; sepalis circa 10 glabris 3 cm. longis oblongo-lanceolatis, ad basin unguiculario-angustatis; staminibus partem 4 tam sepalorum æquantibus, antheris connectivo paullulum producto apiculatis; carpidiis glabris, stylis mediocribus apice revolutis.

"Rhizoma breve validum fibras inferne ramosas emittens ad verticem gerit squamas paucas, folia 2–3 et pedunculum scapiformem.—Folia explanata ambitu ⅔ peripheriæ orbis præbentia circa 12 cm. lata 7–8 cm. longa membranacea, utrinque, subtus præsertim ad nervos, pilosa, marginibus ciliata; foliola subobconico-disposita.—Pedunculi pedales breviter pilosi; involucrum 1.5 cm. longum, 5 cm. a flore insertum, sessile trifoliolatum, foliolis liberis, intermedio ad ⅔ longitudinis trilobo, cæteris oblongis inciso-dentatis; pedunculus secundarius obvius, sed nondum evolutus; involucellum 2 foliolatum basale cum involucro combinatum.—Flos sub antheri 6 cm. diametro; sepala exteriora 8–9 mm., interiora 6–7 mm. lata, nervis e basi prodeuntibus 5–7 superne ramosis.—Stamina 5–6 mm. longa.—Carpidia ultra 20, gynophori prominentiis innixa; ovaria ovato-oblonga in stylos iis æquilongos v. paullo longiores flexuosos tenues, apice stigmatoso circinnatim revolutos attenuata."

Prope Rio de Janeiro; Glaziou, n. 4744.

"Obs. *A. Sellowii*, Pritz., discrepat petiolis 5–10 cm. longis densius pubescentibus, foliolis 0.3–1 cm. longe petiolulatis multo angustioribus, lateralibus ad $\frac{3}{4}$ longitudinis v. plerumque fere usque ad basin 2-partitis, intermedio ad $\frac{1}{2}$–$\frac{2}{3}$ partem trifido, lobis obverse v. subrhombeo-lanceolatis, sepalis 1.2–1.5 cm. longis ad basin brevius et minus angustatis, staminibus dimidium floris æquantibus, antheris obtusissimis v. truncatis; *A. Antucensis*, Poepp. Frag. Syn. Plant. Chil. p. 27, Gay Chil. i, 25, quæ cum *A. Sellowii* magnitudine floris congruit, ab utraque longe recedit foliolis sessilibus, involucro amplo ad 6 cm. longo, involucello segregato, sepalis 6 (an semper?) dorso puberulis."

Not seen by me.

‡ ‡ **Lateral peduncles bracted at the base, close to the primary involucre. Mexican species.**

24. **Anemone Mexicana,** H. B. K.

A. Mexicana, H. B. K., Nov. Gen., v, 33 (1821).

Erect, villous-pubescent, 30–50 cm. high. Radical leaves slender-petioled, 3-parted, the divisions broadly oval, narrowed, or cuneate at the base, deeply incised and coarsely dentate with mucronate teeth; leaves of the involucre two, sessile or petioled, similar to the radical; involucre 1–4-flowered, the first peduncle naked, the others bracted at the base; flowers white, about 2½ cm. broad; sepals 4–6, oval or somewhat obovate, obtuse; head of fruit globose-ovoid; receptacle pubescent; filaments very slender, 2–3 mm. long; achenia ovoid, slightly pubescent, narrowed at the apex, tipped with a short style.

Distrib. Mexico: (Jurgensen, 240; Parkinson); Zinapan (Coulter, 654); Oaxaca (Galeotti, 4540); San Luis Potosi (Schaffner, 30); Santa Rosa (Dugés); Chiapas (Ghiesbrecht, 132).

Type in Herb. Humboldt, Bonpland and Kunth at Paris.

Said by Mr. Hemsley (Bot. Biol. Am. Centr., i, 5) to occur also in the United States, but I have seen no specimens from north of the Rio Grande.

25. **Anemone Hemsleyi,** n. sp.

Erect, 25–60 cm. high, the petioles and peduncles densely pubescent. Radical leaves petioled, 3-parted into ovate slightly stalked, acuminate, sharply and irregularly serrate segments; leaves of the involucre 2, short-petioled, very broadly ovate, obtuse or truncate at the base, 3-cleft to beyond the middle, the divisions acute or acuminate, sharply serrate and sometimes slightly incised; involucre 3–6-flowered, the first peduncle naked, the others bracted at the base, as in *A. Mexicana;* flowers white (according to Linden), 3–4 cm. broad; sepals 5 in the specimens seen, broadly oval, obtuse; head of fruit oblong; receptacle densely pubescent; achenia oblong, glabrous, 5 mm. long, tipped with a short style.

Distrib. Mexico: near Vera Cruz (Linden, 964); Orizaba (Botteri, 21).

Type in the Kew Herbarium.

‡ ‡ ‡ Plants umbellately 1-several-flowered, the peduncles all naked and flowering simultaneously.

o Species of arctic and mountainous regions of the northern hemisphere.

26. **Anemone narcissiflora,** L.

A. narcissiflora, L. Sp. Pl., 542 (1753).
A. fasciculata, L. Sp. Pl., 542 (1753).

Villous-pubescent, but sometimes sparingly so, erect, usually rather stout, 15–45 cm. high. Radical leaves petioled, palmately 3–5-parted, the divisions obovate, cuneate, deeply incised into linear-oblong, obtuse, or acute lobes; leaves of the involucre sessile, smaller, usually less divided, otherwise similar; flowers 1–6, umbellate, peduncled, white, all maturing together, 1.5–3 cm. broad; sepals 5–7, oval-obovate, obtuse; carpels several, flat, oval, glabrous, tipped with a short, curved style.

Distrib. Rocky Mts. (Hall and Harbour, 7). Colorado: (Sheldon); Long's Peak (Vasey, 7); South Park (Wolf and Rothrock, 102). Alaska (Bongard; Mertens; Menzies; Barclay; Fischer; Dall; Stejneger; Townsend; Harrington; Kellogg, 305; Muir, J. M. Macoun). Reported from Newfoundland by Reeks. Also in Europe and Asia.

Type in the Linnæan Herbarium.

oo Species of the Andes of Ecuador.

27. **Anemone Jamesoni,** Hook.

A. Jamesoni, Hook., Ic. Pl., t. 670 (1844).

Rootstock horizontal. Stem erect or ascending, 15–25 cm. high, hirsute; radical leaves long-petioled, ternate, hirsute, the divisions stalked, ternate, and the segments deeply divided into oblong, cuneate, obtuse, mostly dentate lobes; peduncles 1–3, slender, not involucellate; flowers about 2 cm. broad; sepals 5, oval, obtuse, pilose-pubescent without; head of fruit globose, dense, about 1 cm. in diameter; carpels ovate, glabrous, tipped with short, subulate, hooked styles.

Distrib. Andes of Ecuador, 12,000 feet (Jameson, 86).

Type in the Kew Herbarium.

ooo Chilian species.

28. **Anemone hepaticifolia,** Hook.

A. hepaticifolia, Hook., Ic. Pl., t. 1 (1837).

Roots fibrous. Stem erect, rather stout, hirsute with spreading hairs, 30–65 cm. high; radical leaves petioled, 5–10 cm. long, hastate, 3-lobed, thick, hirsute, especially beneath, the lobes acutish, angular-dentate; petioles hirsute, about equalling the leaves; leaves of the involucre sessile, lanceolate, deeply lobed, 3–6 cm. long; flowers umbellate, 2–4 cm. broad, yellow; sepals 5, spreading, elliptic-obovate; achenia ellipsoid, gelatinous, tipped with a short, recurved style.

Distrib. Chili: (Gay; Philippi, 277; Cuming; Lechler, 556); Bay of Valdivia (Bridges, 579); Cerros de Corral, 1000 feet (Pearce).

Type in the Kew Herbarium.

EXCLUDED OR DUBIOUS SPECIES.

Anemone nudicaulis, A. Gray, Bot. Gaz., xi, 17 (1886), from Lake Superior, is *Ranunculus Lapponicus*, L., according to the original specimens in Herb. Gray. It was described from fruiting specimens only.

Anemone anomala, Raf. Fl. Lud., 82 (1817). "Foliis ternis, sessilibus, incisis, floribus pentapetalis, petalis inequalibus," based on *Anemone*, No. 2, Robin, Voy. Louisiane, iii, 463, is wholly unknown. As the flowers are said by Robin to be irregular it probably belongs to some different genus.

3. **HEPATICA,** L. Gen. Pl., 162 (1737).

1. **Hepatica Hepatica** (L.).

Anemone Hepatica, L. Sp. Pl., 538 (1753).
Hepatica triloba, Chaix in Vill. Hist. Pl. Dauph., i, 336 (1786).
H. triloba, var. *Americana*, D.C. Syst., i, 216 (1818).
H. Americana, Ker, Bot. Reg., t. 387 (1819).
A. Americana, ex Nichols., Dict. Gard., i, 74.

Acaulescent, 10–15 cm. high, villous, roots fibrous. Radical leaves long-petioled, reniform, 5–6 cm. broad when mature, spreading and declined on the ground, three-lobed, and the lobes sometimes toothed or again lobed, obtuse; involucre calyx-like, of three sessile, obtuse, oblong leaves immediately under the flower; flowers purple or white, 12–25 mm. broad, on peduncles about equalling the petioles; sepals oblong, obtuse, longer than the stamens; achenia several, 4 mm. long, oblong, acute, hairy.

Distrib. In woods, Nova Scotia to northern Florida, west to Iowa and Missouri.

The American plant does not appear from herbarium specimens to be different from the European, but I have not seen them growing together.

Type, a European specimen in the Linnæan Herbarium.

2. **Hepatica acuta** (Pursh).

Hepatica triloba, var. *acuta*, Pursh, Fl. Am. Sept., 391 (1814).
Hepatica acutiloba, D.C., Prodr., i, 22 (1824).
Anemone acutiloba, Lawson, Trans. Nov. Sco. Inst., iii, 30 (1870).
A. acuta, Vail, Mem. Torr. Club, ii, 42 (1890).
A. Hepatica, var. *acuta*, Hitch., Trans. St. Louis Acad. Sci., v, 482 (1891).

Acaulescent, 10–22 cm. high, villous, and closely resembling the last, differing in the lobes of the leaves and of the involucre which are acute or acutish, these characters being, however, constant.

Distrib. In woods, Quebec and throughout Ontario, south in the Alleghanies to Georgia, but rare or absent near the Atlantic coast, west to Iowa and Minnesota.

I have not seen Pursh's type. The type of *Hepatica acutiloba*, D.C., is preserved at Geneva.

The distribution of this and the preceding species has been capitally worked out by Mr. C. G. Lloyd (Drugs and Medicines, N. A., i, 40, Plate VI).

4. **CAPETHIA,** Britton.

1. **Capethia integrifolia** (D.C.).

Hepatica integrifolia, D.C. Syst., i, 217 (1818).
Anemone integrifolia, H. B. K., ex D.C., loc. cit., et Wedd. Chlor. And., ii, 298, t. 83, f. A, 1, 2, 3, 4.
Hamadryas andicola, Hook., Ic. Pl., t. 137 (1837).

Perennial by a deep, thick, woody root, acaulescent, densely pilose-pubescent. Leaves all radical, numerous, petioled, rhombic ovate, or spatulate, entire, obtuse or acutish, 4–9 cm. long, 1–1½ cm. wide; scape naked, shorter than the leaves; flower 3–4 cm. broad, violet or white; sepals 10–15, lanceolate or linear-lanceolate, loosely pubescent; young carpels very densely pubescent; style slender, curved at the apex.

Distrib. High Andes of Peru, Bolivia, and Ecuador. Peru: (Ruiz and Pavon; Gay, 535; Lechler, 2706; Matthews, 1139;

McLean). Bolivia: (Mandon, 869). Ecuador: Andes of Quito (Jameson).

Type in Herb. Humboldt, Bonpland and Kunth at the Paris Museum.

"Cinerarea del Peru," specimen from Pavon in Herb. Mus. Brit. "Cinerarea del Cordillera," specimen in Herb. Boiss.

2. **Capethia Weddellii,** n. sp.

Leaves ovate, abruptly contracted into the petiole; scape nearly as long as the leaves, bracted at about the middle; flower smaller; head of fruit globose, about 8 mm. in diameter; achenia obliquely ovoid, pubescent; style slender, straight, deflected, inserted below the apex.

This plant is figured by Weddell (Chlor. And., ii, t. 83, f. A, 5, 6, 7) as "*Anemone integrifolia*, β. petiolis scapisque magis elongatis, floribus parvis." I think it must be specifically distinct, but, although I examined the *Anemones* of the Paris Herbarium I took no note of it, and Weddell does not say where it was collected. It is probably Peruvian.

5. **BARNEOUDIA,** C. Gay. Fl. Chil., i, 29 (1845).

1. **Barneoudia Chilensis,** C. Gay.

Barneoudia Chilensis, C. Gay, Fl. Chil., i, 29, t. 1 (1845).

Glabrous or nearly so, 6–12 cm. high. Scape 1-flowered; involucre approximate to the flower, deeply divided into 5–7, obtuse, entire, lobed or bifid segments; sepals about 8, obovate; ovaries densely villous-pubescent; style filiform, curved.

Distrib. Chili.

Type in the Paris Herbarium.

2. **Barneoudia major,** Phil.

Barneoudia major, Phil., Linnæa, xxviii, 609 (1856).

Larger than the preceding species, villous-pubescent above. Involucre pubescent on the upper surface, 5–6-lobed, the lobes 3–5-cleft; sepals about 12, linear-lanceolate, obtuse.

Distrib. Chili.

Type in the Paris Herbarium.

3. **Barneoudia Domeykoana,** Leybold.

Barneoudia Domeykoana, Leybold, Ann. Univ., 1858, 159, et Flora, xlii, 242 (1859).

"Rhizomate tuberculoso; scape glabro; foliis longe petiolatis, glabris, tripartitis lobis obtusato spathulatis, integris vel obtuse 1–3-dentatis; involucro 5–6 lobato, flore densissime approximato, externe glaberrimo, interne basin versus sericeo-tomentoso; lobulis lanceolato-obovatis obtusis integerrimis vel subrepandis; sepalis petaloidis, lineari-obovatis, obtusis; filamentis linearibus; capsulis plurimus cylindricis, e basi longe-sericeis, apice stylo persistente filiformi arcuato coronatis."

Distrib. Chili. In grassy places on the higher Cordillera, blooming at the melting of snow in the latter part of November. Discovered on the Cerro Colorado, in the valley of Mapocho, at an altitude of about 10,000 feet.

Not seen by me.

4. **Barneoudia Balliana,** n. sp.

15–20 cm. high, fleshy, the involucral leaf 3–7-lobed, very thick, 6–7 cm. wide, the lobes rounded or obtuse, obovate, densely and finely appressed-pubescent on the upper surface. "*B. major,* Phil., differs in having the fruit covered with silky hairs."

The specimen on which this species is based is in the Kew Herbarium, derived from the herbarium of the late John Ball. No flowers nor fruit remain upon it, but from the note by Mr. Ball, above quoted, he appears to have seen the fruit. The plant has a decidedly different aspect from *B. major.* It is labelled *Anemone crassifolia,* Hieron., but I cannot find that it has been published. At all events there is already an *Anemone crassifolia,* Hook., from Tasmania (Ic. Pl., t. 257).

Distrib. Argentine Republic: Sierra Famentina, Prov. de la Rioja (Hieronymus).

6. **SYNDESMON**, Hoffmg., Flora, xv, Part II. Intell. Bl. No. 4, 34 (1832).

1. **Syndesmon thalictroides** (L.).

Anemone thalictroides, L. Sp. Pl., 542 (1753).
Thalictrum anemonoides, Michx., Fl. Bor.-Am., i, 332 (1803).
Syndesmon thalictroides, Hoffmansg., Flora, xv, Part II. Intell. Bl., No. iv, 34, 1832.
Thalictrum Carolinianum, Walt., Fl. Car., 137 (1788)?
Anemone thalictroides, var. *uniflora*, Pursh, Fl. Am. Sept., 387 (1814).
Anemone Walteri, Pursh, Fl. Am. Sept., 387 (1814)?
Anemonella thalictroides, Spach, Hist. Veg., vii, 240 (1839).

Low, glabrous, 10–25 cm. high, the flowering stem arising in early spring from a cluster of fleshy tubers, the ternately-compound radical leaves appearing later, and resembling those of *Thalictrum;* leaves of the involucre similar, sessile, the leaflets long-petioled; sepals 5–10, white, longer than the stamens, forming a flower 12–25 mm. broad; flowers perfect, umbellate, immediately above the involucre; stigmas depressed truncate, sessile; achenia terete, sessile, pointed, 8–12 mm. long, ribbed and grooved.

Distrib. In woods throughout the eastern United States, south to Florida, west to Kansas, Minnesota, and Mississippi, sparingly in Ontario. Not reported from the maritime provinces of Canada.

In suggesting the generic name *Syndesmon*, it is said by Reichenbach, the writer of the note in Flora: "Diese Gattung hat Hffmgg. gebildet um sowohl *Anemone* wie *Thalictrum* formen zu reinigen die nicht in selbigen aber sehr wohl zusammen passen."

Pursh's *Anemone Walteri* is based entirely on Walter's *Thalictrum Carolinianum*, which he never saw, and no specimen of it is contained in Walter's Herbarium. From the descriptions it may be this species.

Alluding to Plukenet's figure (t. 106, f. 4), Jussieu says (Ann. Mus. Hist. Nat., iii, 250 (1804): "Cette plante designée par lui sous nom de *Ranunculus*, par Gronovius sous celui de *Thalictrum*, réunie ensuite à l'*Anemone* par Linnæus conservée dans ce genre par tous les autres botanistes, a été de nouveax reportée au *Thalictrum* par Michaux, sous les nom de *T. anemonoides*, fl. Amer., i, p. 322. Il aura pu être determiné à ce changement par les involucres conformeés differemment, et sur-tout par les graines alongées et striées comme celles du *Thalictrum;* mais si d'après les rapports naturels on refuse un involucre au *Thalictrum* et si on l'assigne comme charactère principal de l'*Anemone;* si de plus on suit strictement l'indication de Linnæus que conserve dans ce dernier genre la plante qui a plus de cinq pétalees, alors on sera doublement forcé de n'en point séparer celle qui fait l'object de cette discussion et qui servira seulement à établir une transition de l'un à l'autre genre."

Sims gives a very good figure of it in Bot. Mag., t. 866 (1805), and remarks: "A dubious species, but certainly agreeing in more points with *Anemone* than with *Thalictrum*."

Type of *Anemone thalictroides*, L., in Herb. Linn.; type of *Thalictrum anemonoides*, Michx., in Herb. Michaux.

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Review of the North American Species of the Genus Xyris.

BY HEINRICH RIES.

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